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Illustrated.

The Market for Miscellaneous Mineral Substances

We receive many requests for information as to the market prices for many mineral substances other than ores, such as phosphate rock, pyrites, barytes, etc. So far as we can communicate such information we do so in the list published in the first issue of each month, which list is carefully revised each month. We receive occasionally complaints from producers that they are unable to realize prices so high as there quoted. Perusal of the foot-note of the list would explain the reason. The prices quoted represent what dealers ask for ordinary wholesale lots, not what they will give for supplies offered by producers. With respect to most of these commodities there is no general market, as in iron, copper, etc., wherein transactions are taking place every day, which can be reported, and the reviewing of these markets to report actual transactions would be too costly for any newspaper to undertake.

In general the prices for these commodities do not fluctuate greatly from month to month. In the cases of some of them, e.g. pyrites, brimstone, and phosphate rock, which are the subjects of large business, the quotations represent closely the basis of the actual transactions. In other cases, sometimes of very important commodities, e.g. sulphuric acid, the bulk of the business is done contractually and quotations are wholly misleading to those who are unacquainted with the conditions. Thus, sulphuric acid of 60 deg. B. strength is quoted at about $16@18 per 2000 lb. This is a real price, which a casual purchaser would have to pay for a carload, but the major part of this important commodity goes into consumption under contracts for, say, a year's supply of 1000 tons, 10,000 tons, or whatever may be required, and this business, representing the real acid market may be done at $7 or $8 per ton. So it is with some other commodities.

Speaking generally the producer cannot expect to realize the prices for minerals and chemical products that are quoted by the sellers. For one thing the latter are bound to buy at a margin that will compensate for the cost of distribution to consumers, usually high, and leave a profit. For another thing, the seller accepting a consignment of a shipload or receiving regular deliveries under a contract for entire product always has to allow for storage and interest charges before distribution can be effected, and the risk of having to carry stocks for a long time. As an example of the difference between buying and selling prices may be mentioned white arsenic, a product that is made by several lead and copper smelters. The wholesale market price at New York in 1909 was 2.97c. per lb., the range being 3.25@2.72c.; but the smelters received for their output only about 2c. per lb. under their contracts.

There are some substances for which no representative quotations can be made, the value depending upon chemical and physical qualities. Mica, graphite and talc are minerals of this class. In such cases the prospective producer can obtain an idea as to probable price only by submitting samples to buyers. Almost any of the ore and metal dealers who advertise in the JOURNAL will inaugurate busi-

ness in that way if an offering be brought to their attention.

There are many substances that have a value in the East, which would have none in the West, because cost of transportation to markets would be more than the selling price. A moment's consideration about this would forestall the building of many false hopes. The lowest freight rate from Butte, Salt Lake City and similar points to New York is $10 per ton, this on lead and copper in bars. A substance like kaolin, which finds its principal markets at East Liverpool, Ohio, and Trenton, N. J., cannot be profitably delivered to those places from Nevada. We receive many letters from remote places in the West reporting the discovery of glass sand and inquiring as to market possibilities. This substance has a certain value, about $1.50 per ton, near the places in Pennsylvania, Ohio and Indiana where glass is chiefly made, but the existence of that industry at any place implies a near-by supply of suitable sand and a remote supply has no market. So with cement materials and many other things.

It may be further remarked that the high prices quoted and realized for many substances are because the demand for them is small. An addition to the supply is likely to cause the market to tumble like a house of cards. The markets for cobalt oxide and lithia are recent examples to the point. The historic example of this kind of misconception was the production at Baltimore of a few pounds of tellurium, which could not be sold at all, although there were fascinating quotations for a gram or two for specimen purposes.

A great deal of valuable and explicit information as to the conditions governing the markets for the miscellaneous minerals, the prices actually realized by producers, supply and demand, etc., is to be found in the annual volumes of The MINERAL INDUSTRY, published by the JOURNAL, to which more frequent reference should be made.

Australian Gold

With the exception of Western Australia, the different States of Australia are showing in their reports for the first half of the year a good increase in gold production. Apparently a fair recovery from the comparative depression of the past two years is going on. This is especially the case in New South Wales and Queensland; while Victoria also has been doing better than for some time past. There is no great change, but mining conditions are on the mend, and there is a greater number of men reported at work. Possibly the latter fact is due partly to the depressed conditions at Broken Hill, which have sent many men to seek work elsewhere.

In Western Australia, however, the mines continue to show losses in production, moderate as compared with last year, but very considerable when contrasted with the figures of three and four years ago. The loss is largely in the Kalgoorlie mines, and is due in part to smaller ore production, and in part to the lower grade of ore in several of the better known mines. Meantime no new districts of importance have been opened this year, and prospecting is not active.

The other States, so far as reports have been made for the half-year, have nearly made up the loss in Western Australia. It looks as if Australia, taken as a whole, will about hold its own, but will hardly show an increase.

African Copper

So much has been made out of reports of great quantities of copper to come from Katanga and the recent arrivals in this country of some shiploads of Otavi ore that it is a pity that the daily press and other organs of publicity cannot take more trouble to inform themselves correctly.

Otavi ore has been coming into the market for several years. It is in some respects of peculiar character, being high in both lead and copper. The American Smelting and Refining Company has developed an advanced and economical method for the treatment of such ore, which accounts for its present shipment to this country.

As for Katanga, it is well known that there are immense deposits of copper there, but the difficulties of exploitation are great and it is the consensus of opinion among engineers who have visited the district that a flood of copper is not to be expected immediately from it.

Africa is a great undeveloped country which will doubtless in time to come supply the world with a great deal of copper, tin, gold, diamonds and other valuable things, but neither its copper nor tin is going to figure prominently in the statistics for 1911 and 1912.

Copper Curtailment

Judging from the reports of the production of American crude copper, a curtailment began in June, the output of Lake Superior, Butte, and some other important districts showing a material decrease as compared with May.

Now the president of the Utah Copper Company has just announced that it is going to reduce its output, thus fulfilling the forecast that we made last week.

This decision will surely establish a precedent that will lead other large producers to do likewise, and we shall have a cessation of the excessive production under which the market has been staggering. As soon as consumers realize this we expect a gradual absorption of the accumulation and an improvement in market conditions.

Original overcapitalization and the competition of improved processes have brought the United Alkali Company of Great Britain down to very low profits. In 1909 it was able to pay only 2 per cent. on its ordinary stock, after passing the dividend for the preceding year. On the other hand, Brunner, Mond & Co., controlling the electrolytic processes of alkali production, paid 37½ per cent. These results could be made the basis of an interesting study both of financial and technical management.

The Scotch producers of oil from shale during the past year managed to hold their own and to pay dividends, notwithstanding the very sharp competition pressed on them by the Standard Oil interests in Great Britain; and notwithstanding also a new competition in the form of paraffin wax from the Galician oil producers. The profits of the Scotch oil makers come almost entirely from their by-products, chiefly sulphate of ammonia, of which they are large producers.

The reduction in the dividend on its common stock by the National Lead Company, last week, has excited much unfavorable comment. This company finds itself at present in rather a peculiar position, which to some extent accounts for some anomalies in the market for pig lead, but it is doubtful whether the dividend that has recently been paid on its common stock was ever really justified.

CORRESPONDENCE and DISCUSSION

Views, Suggestions and Experiences of Readers

Average Price for Copper

In the JOURNAL of July 23 reference was made to the quantitative average price for copper in the last 11 years. What is the meaning of this expression?

CUPRUM.

New York, July 25, 1910.

[We multiplied the world's consumption in each year as reported by the Metallgesellschaft, Frankfurt-am-Main, by the average price for each year. The consumption in metric tons and the average price in cents per pound are given in the following table:

Year.	Consumption.	Price.[1]
1899	467,700	16.67c.
1900	512,700	16.19
1901	494,200	16.11
1902	582,500	11.63
1903	586,700	13.24
1904	662,400	12.82
1905	727,400	15.59
1906	727,600	19.28
1907	657,300	20.00
1908	698,300	13.21
1909	782,800	12.98
Totals	6,899,600	15.22c.

[1]Quotational averages, cents per pound, at New York.

Dividing the total sum in dollars by the total tons for the 11 years gives the average of 15.22c. per pound.—EDITOR.]

Consular Reports

The American consul, judging from reports, is expected to pass on all kinds of commercial, mechanical and scientific subjects as well as upon news items and business opportunities. For instance, one group of 20 gold mining claims in Europe covering 54 acres, is for sale. "These mines," says the consul, "have been worked in the most primitive way, the shafts not exceeding 93 ft., and the veins contain quartz of an 87-93 standard. At a few mines steam engines with two pairs of runners are employed. . . . The price asked for the property is $115,875 and further information will be furnished by the party in question upon request."

One wonders what possible further information could be desired!

One of our consuls in Russia describes an exposition of gas engines and in the course of his letter cautiously repeats the claims for economy which are made by the manufacturer of one new engine. He says: "It is claimed that it will furnish 200 h.p. on 36.11 lb. of naphtha per hour, or about 5 gal. Even if this claim is too optimistic, it is not to be dismissed without investigation by a competent mechanical engineer."

"Optimistic" is a most deliciously chosen word! Possibly the consul did not wish to hurt the manufacturer's feelings. However, as the American manufacturers of the best engines of, say, 25 h.p. will not guarantee better than 50 h.p. from 5 gal., and as the most efficient blast-furnace gas engines of say 2000 h.p. require around 10,000 B.t.u. per horsepower, the claim of the above manufacturer that his engine develops a horsepower on 5000 B.t.u., including friction, jacket and exhaust losses is indeed "optimistic."

MARK R. LAMB.

Milwaukee, July 16, 1910.

Standard Screen Series for Laboratory Testing

In the JOURNAL for July 2, T. J. Hoover offers a new series of screens for laboratory work. Some time ago I worked out this matter in detail; accordingly, a few additional remarks may be of interest.

The so called Rittinger series of sieves takes for its base a screen whose apertures are 1 mm. in diameter, called the millimeter screen. Each successive member of the series is 1.4142, i.e., $\sqrt{2}$, times as large as the preceding member. Calling the 1-mm. screen No. 0, any screen of the series is found from the equation $D_n = cf^n$, where D_n is the diameter of the mesh of the screen desired; C is the diam. of No. 0 screen, which in this case is one; f is a factor, which for this series is 1.4142; and n is the number of the screen desired. For finding the sizes smaller than No. 0, n becomes a minus quantity.

The Richard series referred to takes for a factor $\sqrt[4]{2}$, or 1.1892. As this factor is smaller the sieves come nearer together.

Mr. Hoover finds that by using for a factor $\sqrt[3]{2}$, or 1.2599, which is intermediate between the two above, he gets a more desirable series for his work, and that starting with 1 mm., the fifteenth sieve, or sieve No. 14, figures out 25.3984 mm. which is approximately 1 in. Thus both the even millimeter and inch enter into this series.

DIFFERENT SIEVE SERIES NECESSARY

Different classes of work and different products need correspondingly different sieve series. No one series can be found which will fit all cases. There are theoretical reasons for using the square or cube roots of 2 as factors, but in practice the detail to which the work is to be carried, is the chief factor in choosing the screen series. Also if the mineral is so crushed as to produce a large proportion of fines, the sieve intervals should be more frequent; i.e., the series factor must be smaller than when few fines are made.

If it were more advantageous to use No. 10 sieve instead of No. 14 as the even-inch member the factor 1.3919 could have been used. If 20 screens were desired the factor 1.1755 would be used. A factor can be readily found from the formula $D_n = Cf^n$ which will carry the series from any given size to any other with any desired number of sieves.

In experiments that I carried out, the so called double Rittinger series were used. Here the factor was about 1.211. As it is impossible to obtain sieves of exactly the sizes desired, and as they wear larger as well as become irregular as to aperture sizes, the methods described below were used for plotting the results and for standardizing the series. This procedure makes it unnecessary for the screens to be exactly the desired sizes, and gives the data in a much clearer and more accurate manner than any method which I have ever seen.

THE CHRISTENSEN SIEVE SCALE

The smallest sieve of the series was assumed to be 0.080 mm., and the largest 2.06. These measurements had been carefully taken and were probably correct. There were sixteen intermediate sieves. Assuming the 0.080 member as No. 0 and the 2.06 as No. 17, the equation for the series becomes $2.06 = 0.080\ f^{17}$, which makes f, 1.2106, i.e., 1.211. The No. 1 sieve should, therefore, have been $0.080 \times 1.211 = 0.097$ mm. The No. 2, $0.097 \times 1.211 = 0.117$; etc.

Had the sieve series been perfect, that is, had the actual aperture measurements corresponded to the calculated figures, the product on each sieve would have been represented on the plot by a unit space in the ordinate column. However, the second, or No. 1, sieve was found—in a way to be described later—to have been 0.102 mm. Thus the interval between these two series was approximately $(0.102 - 0.080) \div 0.097 - 0.080) =$ 1.295 times as great as it should have been. Therefore the ordinate space allotted for plotting the mineral passing the 0.102 and caught on the 0.080 screen was made 1.295 units instead of a single unit. In this way the ordinate space allotted for

the plotting of material caught on each sieve was proportioned to the relative part of the series which that space occupied in the series.

Having once secured this table for the sieve series, at hand, various sizing tests were made. The weights of the materials caught on each sieve were plotted, not merely as abscissas, but as areas. Figs. 1 and 2 show sizing tests thus plotted. Should the products have been plotted with equal ordinates, i.e., the abscissas proportional to the weights only, the data would have lost their value. It is thus seen that so long as the true figures for the screens can be found, it is of no particular importance if they coincide or not with the figures called for by the series used. In fact several screens could have been entirely omitted without necessarily injuring the accuracy of the results.

Sizing Tests to Establish New Scale

Eight independent sizing tests, made on different minerals (quartz, pyrite, galena and slag) crushed in different ways, were screened, and plotted as described above and as shown in Fig. 1. Each such plot corresponds closely to a geometrical-progression curve, of the form $X = cf^y$. In plotting these data for the first time, the screen figures were assumed to be as they were marked. It was noticed that for certain screens each plot varied to the right or left of a smooth curve. It is not likely that in each of the eight independent tests there was a dearth of certain sized grains and an excess of certain other sizes. Therefore such figures were found for the sieves that, assuming these figures and plotting the tests with them, the plots would not in every case have a tendency to one side more than to another of a smooth curve.

The figures thus given to the series did not differ greatly from those figures already marked on them, but could be stated with some degree of certainty to three places instead of two, which was as close as could be attempted before. The figures thus found and ascribed to the screens were thereafter assumed as correct. In subsequent plotting where these figures were used, even results were obtained in place of the irregular ones which characterized the former plots. There are numerous considerations why such a method of standardization is better than simply the mechanical measurement process.

Using the screen series described, all the natural products tested gave curves lying between the limits $X = 7.60 \times \overline{1.14}^y$ and $X = 8.80 \times \overline{1.32}^y$. Fig. 1 shows how near to the equation the actual plots lie.

Mr. Hoover's machine for mechanical sizing deserves commendation, as I can testify, for I have spent weary days trying to do what a machine should be able to do much better.

In view of the ease with which the slide rule reduces arithmetic, and as the inch sieve is not used in the laboratory, I see no reason why the even inch should be put into our screen series.

ARTHUR O. CHRISTENSEN.

Sombrerete, Zac., Mexico, July 12, 1910.

Commercial Cyanide

The statement made by J. C. Clennell in the JOURNAL of June 25, 1910, that the indirect method of sodium-potassium determination only gives sufficiently accurate results when both metals are present in considerable amounts, may be found in some of the well known textbooks and consequently is by many accepted as correct. I notice that W. J. Sharwood makes the same remark in his article on "Commercial Cyanide" in the JOURNAL, March 19, 1910. Fresenius[1] says: "The indirect method of determining soda and potassa is applicable only in the analysis of mixtures containing tolerably large quantities of both bases." Sutton[2] says: "Indirect methods like this can only give useful results when the atomic weights of the two substances differ considerably and when the proportions are approximately equal."

Indirect Method of Determination

On the other hand, equally good authority can be quoted to the contrary. Classen[3] says: "Instead of separating the potassium as potassium-platinic chloride the total chlorine in a weighed portion of the mixture may be determined, and the potassium chloride and sodium chloride then calculated. This indirect determination of potassium in the presence of sodium is of general applicability, and may be used whatever the proportions of the salts in the mixture."

Crookes[4] says: "The direct method of estimating potassium and sodium, viz., by the precipitation of the former as potassium platino-chloride, and reckoning sodium from the loss, though sufficiently accurate in patient and skilful hands, is yet open to many sources of error and at the best is exceedingly tedious and troublesome. The indirect method does not appear to possess the confidence of chemists, at least it is rarely mentioned in published investigations. P. Collier, assistant in the Sheffield laboratory, Yale University, has published a number of experiments to ascertain the limits of error in this process." After describing the making of standard solutions and the method of titrating the chlorine with silver nitrate, Crookes proceeds as follows: "From a long list of analyses given by the author it is shown that the indirect method is in all cases equal in accuracy to the ordinary separation, while in the matter of convenience and economy of time there is no comparison between them. In no case does the difference between the quantities taken and found of either alkaline chloride, exceed two milligrams and in most cases it is less than one milligram. The correspondence between the amounts of chlorine taken and found is of course still nearer. The error that appears in the estimation of the chlorides, would be considerably reduced if, as usually happens, the metals were calculated as oxides."

Error in the Indirect Process

In view of these conflicting statements let us endeavor to see for ourselves, but without going too far into the matter, what is likely to be the error in this process as it ordinarily would be carried out. Error may occur (1) in ascertaining the weight of the mixed chlorides or (2) in determining their percentage of chlorine.

Taking the second point first and supposing that the mixed chlorides have been obtained pure and correctly weighed, it can easily be shown that the error of the chlorine determination is not likely to be serious. The chlorine silver-nitrate titration is a very exact and reliable one, and duplicate titrations made on a chloride solution need not differ by more than a single drop of 1/10 normal $AgNO_3$. But suppose that on titrating 0.5 gram pure KCl there is an error of 0.1 c.c., which is as much as is likely to occur, the material would figure out to KCl 99.5, and NaCl 0.5 per cent.

There is no use pretending to go into the second place of decimals in calculations of this kind as the atomic weights on which they are based have not been determined to that degree of accuracy. Here the error on the KCl is 0.5 per cent., but on the NaCl it amounts to infinity. If the material were KCl 99.5, NaCl 0.5 the error would be 0.5 and 100 per cent. respectively, if it were KCl 50 and NaCl 50 the error would be one per cent. on each constituent.

Error in Weighing

If the error is in the weighing and amounts to plus or minus one milligram, so that instead of 0.5 there has been found 0.501 or 0.499, and the percentage of chlorine has been correctly determined, we then have in any case merely a total of 100.2 or 99.8 instead of 100, the relative proportions of the two salts being correct. Any loss of material in manipulation would cause this kind of error. If the error in weighing is caused by the admixture of some foreign substance not containing chlorine it is different, as we then have 0.501 containing, in the case

[1] "Quantitative Analysis," seventh edition, 1876, p. 411.

[2] "Volumetric Analysis," ninth edition, 1904, p. 144.

[3] "Quantitative Analysis," 1902, p. 104.

[4] "Select Methods in Chemical Analysis, Chiefly Inorganic," fourth edition, 1905, p. 19.

of NaCl, 0.303 gm. Cl (60.6x0.5) which gives 60.5 Cl, and a result of 99.2 NaCl and 0.8 KCl instead of 100 NaCl. Any error arising from contamination by substances containing a greater, or a less percentage of chlorine than the mixed chlorides, like any error in determining the percentage of chlorine, is multiplied by 7.69 in making the calculation.

Now suppose that there is an error of this kind in the weighing of two milligrams, and an error in the titration of 0.2 c.c. both of these errors being in the direction of reducing the percentage of chlorine found, and that the material is NaCl.

Instead of 0.5 gm., we have 0.502 gm. and instead of using 85.47 c.c. $AgNO_3$ we have used only 85.27. This works out to 60.3 per cent. chlorine, which gives 97.7 NaCl and 2.3 KCl instead of 100 NaCl. In any proportion of the salts the error of the result is 2.3 per cent. KCl too much. The errors assumed in this case are both, I think, about twice as great as are to be expected in a carefully carried out operation, yet the result is good enough for almost any purpose which does not necessitate an exact determination of the minor constituent. Moreover there would be always an even chance of these errors balancing themselves, in which case the result would be sufficiently accurate, and I think it would be fair to say that with reasonable care the proportions of the two salts may be determined to about one per cent.

With Special Care Indirect Method Sufficiently Accurate

It appears from this that the statement that this method is not applicable, or not sufficiently accurate, when only a small proportion of one of the salts is present can only have reference to those cases in which the correct determination of the minor constituent is the point at issue, but even then it seems that with special care and precautions to insure accuracy the method may be made as accurate as the direct determination.

This is not the question in the examination of commercial cyanide, where all that is wanted is an approximation of the relative proportions of soda and potash, and the advantages of the method for such a purpose have already been pointed out in the quotation from Crookes.

As regards the fusion process for moisture determination, Mr. Clennell's remark that it is not accurate is quite right, but again, the desideratum is an easy and rapid method. Presumably the only really correct method would be to warm in a current of carefully dried hydrogen or nitrogen, and pass through a calcium chloride tube, which would then be weighed, but there is not the remotest chance of such a method being adopted by the busy works chemist or assayer.

RALSTON BELL.

Edinburgh, July 14, 1910.

Provisions for Mine Rescue in British Columbia

SPECIAL CORRESPONDENCE

The Legislative Assembly of British Columbia last March made some amendments to the Coal Mines Regulation Act, in force in the province, including the following:

"82a—There shall be established by the owner, agent, or manager of every colliery to which this act applies, such number of oxygen helmets, or some such form of mine-rescue device as may be approved by the Minister of Mines. Such mine-rescue apparatus shall be constantly maintained in an efficient and workable condition and shall in all cases be so stored or placed in or about the mine as to always be available for immediate use.

"The Lieutenant-Governor-in-Council may from time to time establish mine-rescue stations for the purpose of supplementing, in case of need, the colliery installations of mine-rescue apparatus and also for the purpose of training the holders of certificates of competency under this act in the use of such mine-rescue device as may be approved by the Minister of Mines; and it shall be incumbent on the owner, agent, or manager of every operating mine to which this Act applies to retain such number of employees trained in the use of such established mine-rescue apparatus as the chief inspector of mines may deem sufficient.

"Provided, that in cases of emergency such stations shall be available for the use of any trained corps of mine-rescuers, duly qualified medical practitioners, or corps trained in the work of first aid to the injured.

"This section shall come into force upon proclamation by the Lieutenant-Governor-in-Council."

A Station Already Established

The proclamation provided for in the last quoted clause has not yet been gazetted, but will be before the close of the current year. Meanwhile, the Western Fuel Company, of San Francisco, owning and operating No. 1 Shaft, Protection shaft, and Northfield No. 4 mines, near Nanaimo, Vancouver island, has obtained Draeger oxygen breathing apparatus and had some of its men trained in its use.

With a view to the early establishment of mine-rescue stations, as required by the act, the government of British Columbia has ordered full mine-rescue Draeger apparatus for the equipment of three stations, one of which would be in the Crow's Nest Pass coal-mining district, probably at Hosmer as being central and on the Crow's Nest railway, and two on Vancouver island—at Extension and Cumberland, respectively. It is planned to fit up a railway car at each station for the convenient storage of the apparatus, so that there may be no unnecessary delay in transportation in cases of emergency.

Geological Explorations in the Yukon and Northwest Territories

The Canadian Department of Mines has recently issued a preliminary report on the McKenzie mountains, and on the Pelly, Ross and the Gravel rivers of the Northwest Territory. Field work has been carried on in the Yukon Territory by various members of the Canadian Geological Survey since 1897. The work heretofore has been confined principally to the areas where active mining was in operation. The present report takes up much of the unexplored territory along the rivers, and is to be regarded only as a "first" contribution in the study of the geology and topography of the McKenzie mountains and vicinity.

Geology

There appears to be a close connection in the Yukon Territory between the crystalline schists and the placer deposits. In the valley of the Pelly these rocks appear to occupy a belt extending about 10 miles on each side of the river, which flows parallel to their strike.

During the last few years, work in the Pelly district has been confined to streams entering the Pelly from the south, between Lapie and Hoole rivers. These streams head in Pelly mountains, a high range lying south of and parallel to the course of the Pelly.

Along the base of these mountains is a wide abandoned river valley, covered with wash gravel and containing several small lakes. This valley is separated from the Pelly river by a narrow belt of low rocky hills, through which the streams have cut channels. The gravels of the old valley carry some coarse and fine gold, and the streams in flowing across it concentrate a portion of this gold on bed rock.

Only Gold Sought at Present

Under the present conditions it is unlikely that anything other than gold will be sought. A superficial examination indicates that the country in the vicinity of Ross and Gravel rivers is likely to be unattractive to the prospector or miner. There is a marked absence of vein quartz either in the bed rock or stream gravels. The intrusion of granite in sedimentary rocks does not appear to have been accompanied by any mineralization. A small amount of lignite has been found on Gravel river. Hematite occurs also on Gravel river about 10 miles below the mouth of the Natla river. The ore carries about 25 per cent. iron.

DETAILS of PRACTICAL MINING

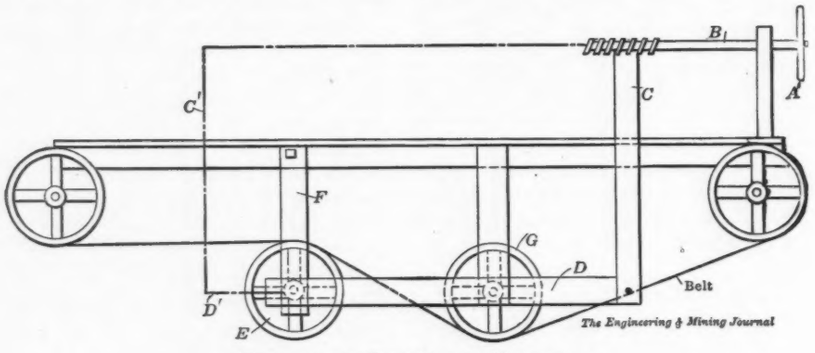
Notes of Interest to Prospectors and Operators of Small as Well as Large Mines. Things That Have to Be Done in Everyday Mining

A Vanner Regulator

Millmen on the Mother Lode of California have evolved many labor-saving devices for the regulation of mill machinery. The device for adjusting a vanner belt, shown in the accompanying drawing, is used in the 60-stamp mill at Melones, near Angels Camp, Cal. On the ordinary vanner concentrator the belt travel must be regulated by handscrews on the side of the table. This makes it inconvenient for the vanner man to perfect the necessary adjustment and takes up a lot of unnecessary time in climbing between the tables.

With the arrangement shown, the travel of the belt is regulated from the end of the table by a wheel that is operated from the aisle between the tables. To adjust the travel of the belt of the vanner it is only necessary to revolve the wheel *A* which is connected by the rod *B* to the wooden rod *C*, screwing into the latter so that by rotating the wheel *C* is swung in either direction. The rod *C* is pivoted on the frame of the table and communicates its motion to a second rod *D* which is connected to the axle *E* of the tightening roller under the vanner belt; *D* has no connection to the dipping roller *G*. The axle *E* is suspended from the frame of the table by the hanger *F*. By using a worm gear, a delicate adjustment of the table is made possible and there is much more likelihood of the vanner man keeping his tables in adjustment if there is a minimum of exertion required for perfecting these adjustments.

The dotted lines in the drawing indicate another arrangement by which the same result is obtained. The rod *B* is fastened to *C'*, which is connected by a short lever *D'* that transmits the motion to the axis of the roller *E*, as in the other case. The former arrangement has the advantage of requiring a shorter iron rod, but either is satisfactory.



REGULATING DEVICE FOR VANNERS

Increasing the Life of a Dredge

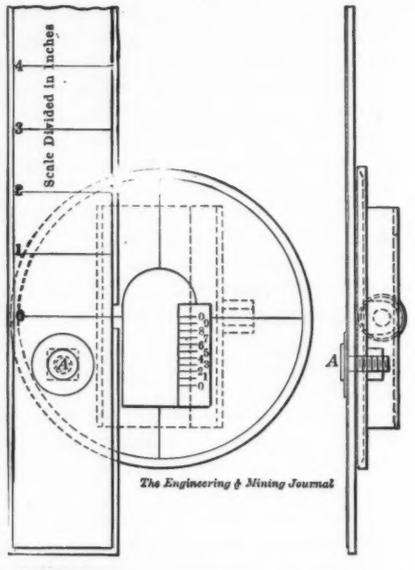
The life of the dredge is to a large extent determined by the life of the hull. With proper care and construction, the average life of a hull in the California dredging fields is from 8 to 10 years. However, if proper means are not taken for the prevention of dry rot, or if the best construction is not used, a hull will go to pieces in four or five years. Considering that the larger boats now being built cost anywhere from $150,000 to $300,000, it is evident that the life of the boat is an important factor in the consideration of any dredging problem.

It is usual to treat the timbers of the hulls with "carbolineum," or some such wood preservative, but even when this precaution is taken, unless pains are also taken to afford good ventilation in the hull, dry rot will soon get through the coating of preservative and into the timbers. On the No. 3 Folsom boat of the Natomas Consolidated of California, operating in the American river field, artificial ventilation of the hull is being tried with a view to increasing the life of the timbers. Air is forced into the hull by an 8-in. fan blower, built by the American Blower Company and operated at 1800 r.p.m.. The air is forced in at one end of the hull, and the intermediate hatches are battened down so that circulation is enforced throughout the entire length of the hull. It is hoped by this means that rotting of the timbers will be checked, and it is evident from the cost of the boat that prolonging its life for even a few months will pay many times over for the extra cost involved.

A Level Rod Attachment

BY LEE FRASER*

The level-rod attachment shown in the accompanying illustration was devised by L. T. Eaton to facilitate the routine of leveling and recording the level notes. Its main feature is to enable the level man to read inches on the ordinary rod which is divided in tenths. The attachment consists of a scale 12 in. long, divided into inches and fractions. It is fastened to the target by a nut and a thumb screw *A* passing through a hole in the target so that the zeros of both target vernier and scale coincide. The scale may be readily constructed upon a strip of bristol board 1¼ in. wide and 15 in. long, which is then pasted upon a strip of wood ⅛ in. thick, 1⅜ in. wide and 16 in. long. The application of several thin coats of varnish affords excellent protection to the scale.



LEVEL-ROD ATTACHMENT FOR CONVERTING TENTHS OF A FOOT TO INCHES

USE OF THE ATTACHMENT

The method of using the attachment is extremely simple. It is fastened to the target and the target is then set upon that foot division of the rod above which it is desired to read. The reading in feet is then taken directly upon the rod, while the inches are read directly upon the scale.

*Mining engineer, Abangarez Goldfields of Costa Rica, Puntarenas, C. R.

The uses to which this device may be put are many and varied. It has special advantages over an architect's rod in construction work, by reason of its portability and ready adaptability to use with the customary rod graduated in tenths. In the work of cross-sectioning roads and pavements for estimates, and for setting grades, much unnecessary and tedious labor is obviated by its use.

The Handling of Wet Concentrates

BY M. J. ELSING *

At Cananea, Mex., the wet concentrates from the Cananea Consolidated mill are loaded into small, narrow-gage railroad cars and transported to the main ore bins. From these bins they are fed to a belt conveyer which passes through the sampling works to the mixing beds.

A simple ingenious device has been introduced which greatly reduces the cost and the labor of handling this wet material. From the jarring and the settling that it receives in the railroad cars the wet concentrates become so firmly packed that even after the bottom of the car has been released, the concentrates will not fall from the car. Formerly it was necessary for two men to do considerable barring in order to dislodge the concentrates and empty the car. A compressed-air device is now used which saves all barring.

USE OF COMPRESSED AIR

The device consists of a 1¼-in pipe, approximately 9 ft. long, with a short piece of pipe attached, which is pointed at one end with a hole in it about ¼ in. in diameter. The short piece is attached with an ordinary pipe coupling. At the other end of the long pipe there is a valve attached and an ordinary air hose. This is then connected with an air main under a pressure of from 80 to 90 pounds.

With this device a Mexican stands on each end of the railroad car, thrusting the pointed end well toward the bottom of the loaded car, and turns on the air. The result is that with a small amount of barring with this device the car is quickly unloaded. The concentrates are literally blown out. Formerly it took from one to 1½ hours to unload a train of from six or seven cars. It is now done in about 15 to 20 minutes.

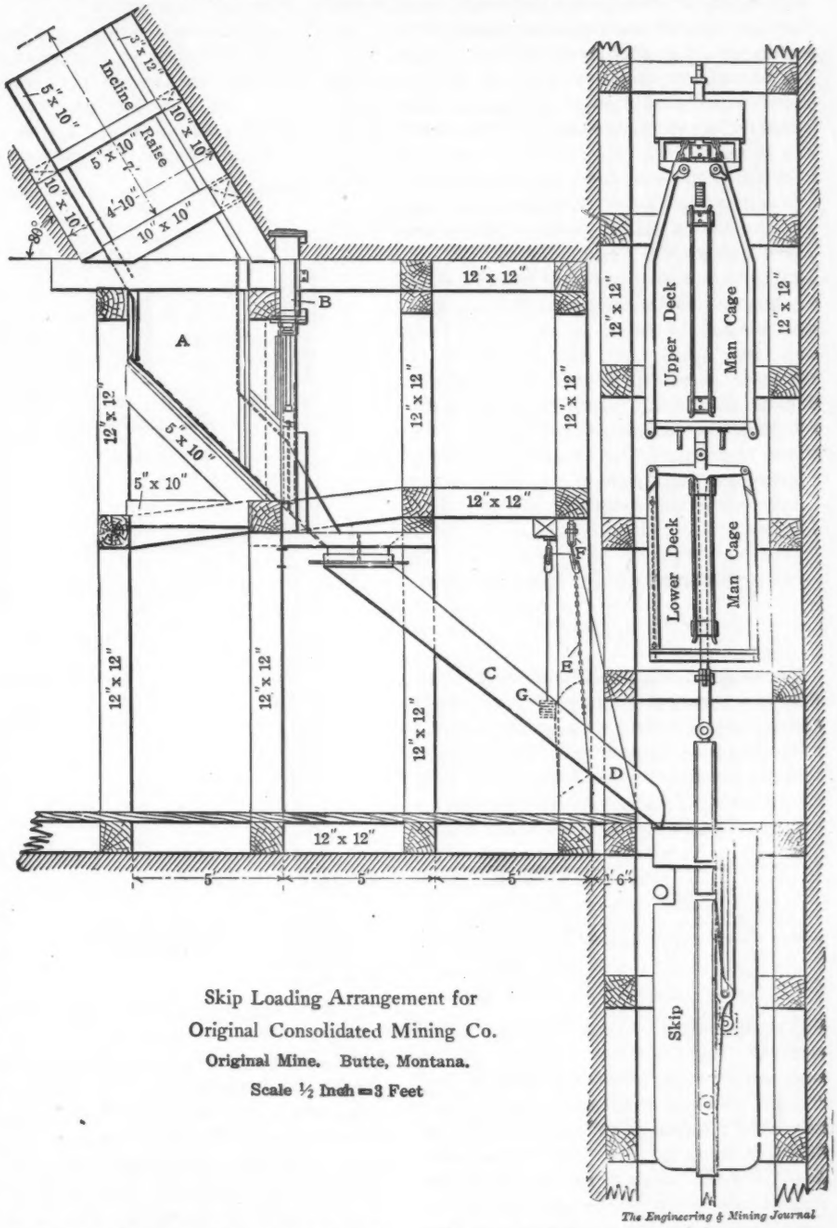
The device is again used in feeding the concentrate from the steel bins to the belt conveyer. A steady feed is obtained with the expenditure of only a small amount of air and labor. The introduction of this device has reduced the labor and the cost of handling the wet concentrates and perhaps it will be applicable in other camps.

*Mining engineer, Box 825, Bisbee, Ariz.

Skip Loader at the Original Consolidated

At the Original Consolidated mine, Butte, Mont., a novel skip-loading arrangement is being used in place of the ordinary ore pocket discharging directly into the shaft. The ground at this mine is rather heavy and it was not thought advisable to take away support from the shaft by cutting out the ground for skip-pockets. By using small apron chutes mounted on wheels, the skips were formerly loaded directly from cars. This method is, however, slow and requires too much labor shifting and dumping the cars, etc. To avoid this, the arrangement shown in the accompanying drawing was devised and has already been installed on several levels of the mine.

Above the ordinary station, 10 ft. high in the clear, an additional space, 6½ ft. clear above the station proper, is cut and timbered with 12x12-in. material, as is shown in the accompanying drawing. The top of the station timbers forms a platform upon which a man can stand while operating the air gates on the chute. At the third station set from the shaft a two-compartment raise inclined toward the station at 80 deg. from the horizontal, is put up to the level above. This chute is carried 4 ft. 10 in. square overall and is timbered with 10x10-in. material framed in 7-ft. sets, with dividers of 5x10 material midway of each set. The chute compartments are lined with 5x10 material on the bottom, and 3x10 on the top and sides. The inclined raise terminates at its lower end in the hopper-bottom pocket *A*. The chutes are provided with steel gates, operated by compressed-air cylinders *B*. The discharge is into a long sheet-steel, swinging spout *C*, the lip *D* of which, when turned



Skip Loading Arrangement for Original Consolidated Mining Co.
Original Mine. Butte, Montana.
Scale ½ Inch = 3 Feet

down projects into the shaft far enough to deliver rock into the skip.

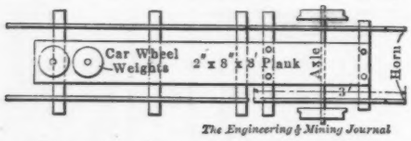
The steel apron-chute is pivoted at its top end, so that the lower or discharge end may be swung to either shaft compartment. This chute is supported by a chain *E*, that is fastened to the pulley *F*. This pulley runs on a short track, thus enabling the spout to be easily swung. The lip of the spout is connected by a line passing over two blocks, to the counterbalance *G*. This weight serves to keep the lip raised, so that the spout will swing clear of the shaft timbers. The counterbalance is lifted and the lip let down when a skip is to be loaded, the spout being swung out of the way when not in use.

When loading a skip, one man climbs up to the platform and operates the air gate on the raise (or pocket), while another swings the spout, lowers the lip and calls out when the skip is filled. By having the loading arrangement at a station instead of below in the shaft, time and labor are saved. The inclination of the raise carries it to the level above at a point far enough away from the shaft, so that the nuisance of having cars block the station is done away with. Having the approach to the shaft clear is an important advantage of this skip loader.

Automatic Car Dump

By H. J. Nelms *

A car dump which is capable of handling two cars per minute may be easily and cheaply constructed as shown in the accompanying illustration. The dump is built to revolve on a common car axle, or an axle 2½x2½ in., if possible to obtain. The rails which form the dumping device are just long enough to hold the car truck and the forward end is turned up in the form of a horn to hold the car in place when it is turned. The car to be dumped is run on, and just before reaching the horn two chains fastened to a tie in the main track are connected to the top of the rear end of the car. As soon as the car reaches the horn the dump revolves on the axle and turns the car to a vertical position. The chains hold the car from turning over too far. The long plank fastened to the ties between the rails extends about 5 ft. on the main track. Two old car wheels are fastened on the end of the plank to bring the car back to place when dumped. The device here described is used for handling slate in western Pennsylvania.



Dumping Device for Ore Car

*Castle Shannon, Penn.

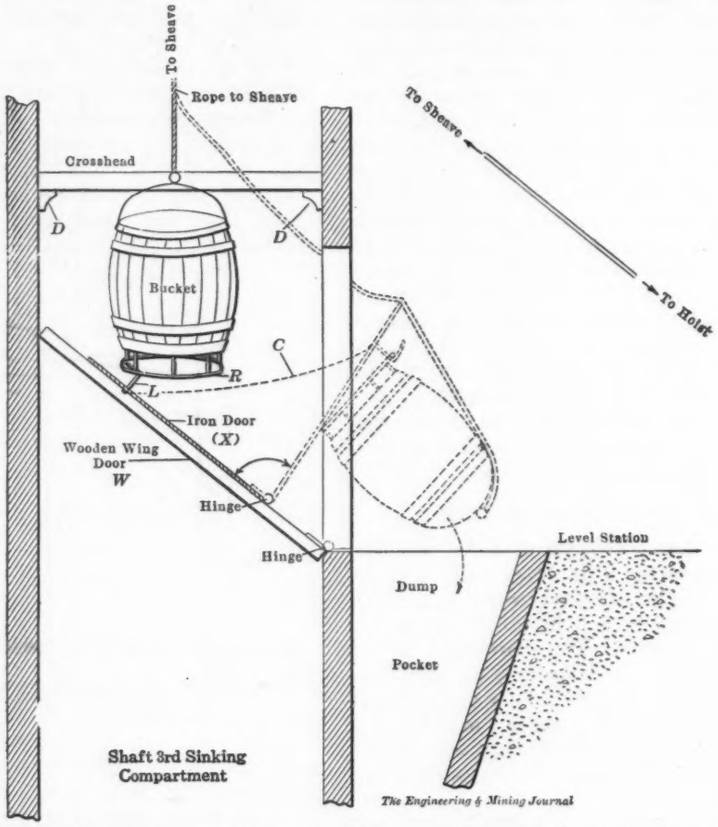
Safety Dump for Sinking Bucket

The accompanying sketch shows a satisfactory and novel method of automatically dumping a sinking bucket. The scheme was used in sinking from the 3150 to the 3300 level in the Kennedy mine, Jackson, Amador county, Cal. Sinking was conducted in the third, or pipe and manway, shaft compartment so that hoisting was not interrupted.

At the upper level station a wooden wing door *W* is hinged so that when released after the bucket has been raised above the level, it swings from a nearly vertical position to one across the shaft compartment as is shown in the drawing. In this position it completely closes the shaft. A second door *X* built of sheet iron is hinged at its lower edge to the wing door and fastened to it by a chain *C* at its upper edge. There is an iron lug *L* riveted on the upper side of the iron door. From the bottom of the bucket is rigidly suspended by four iron straps, a circular hoop *R* of 1-in. drill steel.

When the bucket is raised above the level, the same lever that drops the wing door throws out the dogs or chairs *D* which hold the crosshead while the bucket is dumping. On releasing the bucket the iron hoop engages the lug and the weight of the loaded bucket swings down the iron door into the position shown by the dotted lines. The chain keeps this flap door from swinging beyond the position indicated. The bucket is then hoisted, this swinging the iron door back against the wooden wing door. The engineer then pulls back the wing door and at the same time releases the dogs holding the crosshead. The bucket may then be lowered for another load.

The operation of dumping is automatic save for the swinging of the wing door. However, the man operating the hoist attends to this without leaving his position at the engine. The men at work in the shaft are absolutely protected from falling rocks while the bucket is being dumped. The bucket dumps into the regular pockets, and the rock may be drawn into the skip in either of the hoisting compartments.



Arrangement Used at Kennedy Mine for Dumping Sinking Bucket

Sand Filling at Village Main Reef Plant*

A large brick chamber to facilitate sand filling at the Village Main Reef mine, South Africa, is in course of completion near one of the outcrop shafts. The compartment, built below the ground level, is about 40 ft. long and is divided into two sections by a longitudinal wall. The larger of the two sections constitutes a kind of hopper, to which sand will be conveyed by means of an endless rope track from the tailings dump. The

*South African Min. Journ., Apr. 30, 1910.

remaining compartment will contain the pumping gear. The floor of the sand bin will slope at a 25 per cent. grade to a launder in this latter section, where wide openings in the longitudinal wall will permit of water flushing from a series of jets at a pressure of about 100 lb. per in. Thence along a fall of about 12 per cent., the material will flow to a neighboring shaft, down which it will be conveyed in a 5-in. pipe to the workings. The brick bins will contain about 500 tons of sand and probably some 1000 tons will be sent down per diem.

The Village Deep will be first supplied, and a little later, when the necessary arrangements are completed, the Village Main Reef will commence the filling process. About 1,000,000 tons of cyanide-free tailings are already available for the purpose, and no difficulty is foreseen in keeping the plant going on the same kind of material, even without neutralizing it. In any event samples will be taken regularly 24 hours ahead of the trucks, so that no danger whatever need be apprehended. No effort, in fact, will be spared to avoid the smallest possibility of danger.

Reinforced Concrete Reservoirs*

By J. B. Henson†

In effecting a combination of steel and concrete for any particular purpose, great care must be exercised in proportioning the steel to the stresses to be resisted and placing it in the body of concrete, where it will prove most effective. The concrete forms the body of the structure, resists the compression stresses, enables the desired shapes and forms to be obtained, maintains the steel reinforcement in the position assigned to it, and protects it from corrosion.

In designing the shell of a reinforced-concrete reservoir, the tensile strength of the concrete is not taken into account, dependence being placed entirely upon the embodied steel rods to resist the bursting pressure of the water. The accompanying diagram shows the thickness of shell, the position and size of the horizontal steel reinforcement in the reservoir.

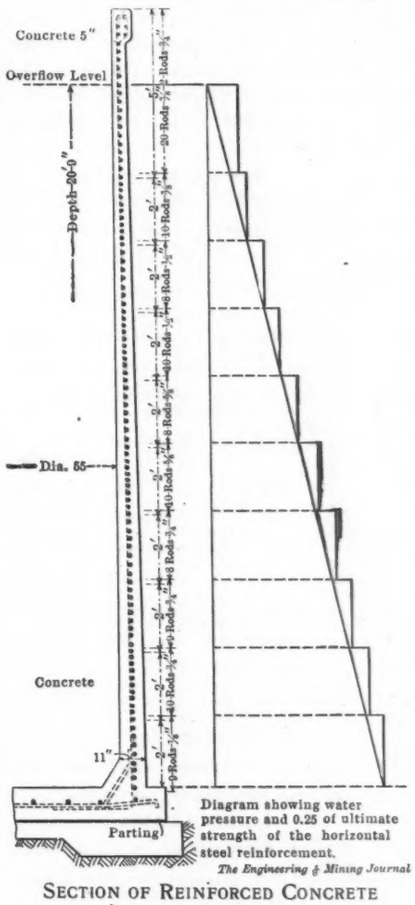
The Pelaw Main Reservoir

The Pelaw main reservoir at Cessnock, N. S. W., is 65 ft. in diameter, and 25 ft. high. Its capacity is 500,000 gal. Before any concrete was deposited on the rock bottom, the whole surface was thoroughly tested for soundness, by being struck with a heavy sledge. Wherever the sound indicated a hollow, further examination was made and in this way hidden defects were cut out. A liberal time was allowed for the concrete filling to set, and on the platform thus formed the reservoir was erected.

The floor is formed of 1-2-4 concrete without reinforcement, except near the base of the wall, where the vertical ¼-in. wall rods are turned horizontally and extend into the floor concrete for a length of 2 ft. 3 in. These rods were placed in position when the concrete of the floor was laid, and are spaced 4 in. apart. A water pipe was erected at the center of the reservoir floor and a radius rod attached thereto was used for setting out the base of the wall and the vertical rods of the reinforcement.

Details of Construction

The wall or shell is reinforced con-



Section of Reinforced Concrete Reservoir

crete and has a finished thickness of 11 in. at the base and 5 in. at the top. The concrete is composed of one part cement, two parts sand, and two parts blue-metal screening. The reinforcement consists of steel rods, placed horizontally and vertically, and tied together with 22-gage black iron wire at each crossing. The lowest rods are 1 in. in diameter; the next above, ⅞-in., and so on by reduction of ⅛ in. until ⅜-in. rods are employed at the top. A factor of safety of four was used in designing the reinforcement necessary to resist the pressure. The ends of all the rods were cogged about 2 in. to insure a good hold in the concrete. The overlap provided for the rod varied from 1 ft. 8 in. at the top to 3 ft. 4 in. at the bottom of the reservoir.

Concrete Forms

The forms used were made of 1x12-in. dressed Oregon boards, connected so as to form one continuous band for the outside, and a similar band for the inside. Three pairs of such forms were used; two forms having been made fairly secure, concrete was deposited between them in 6-in. layers, each well rammed and the concrete worked into the meshes of the reinforcement. A thin steel paddle was worked against the side of the form to insure a good solid face on the concrete. Immediately before fresh concrete was deposited upon that previously set, the surface was cleansed with water and brushed over with neat cement. The forms were kept in position 48 hours before removal.

Surfacing the Reservoir

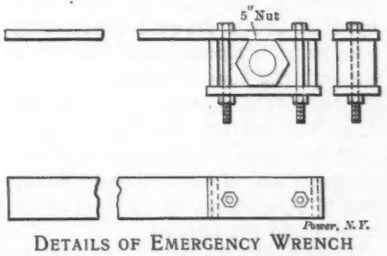
On completion of all the concrete work, the floor and inside face of the walls were surfaced or plastered with cement mortar, composed of one part cement and one part sand. The surface was then brushed all over with neat cement. The outside face of the shell was also plastered with mortar composed of one part cement and two parts sand.

Cost of Construction

The total cost of this reservoir was £2287, which is at the rate of £4 11s. 6d. per 1000 gal. capacity. The Neath reservoir, constructed in the same district, is 55 ft. in diameter, 23 ft. high, and has a capacity of 300,000 gal. It cost £2012, which is £6 14s. 1½d. per 1000 gal. capacity.

An Emergency Wrench

A wrench made to tighten a 5-in. locknut when there was no wrench at hand large enough for the purpose, is described in *Power*. Two pieces of flat iron, one piece being 2 ft. long and the other 7 in. long, were obtained. Two holes were drilled in each piece



Details of Emergency Wrench

6 in. apart and bolts slipped through, connecting the two pieces. Then two pieces of iron, 5 in. long, were cut and placed between the drilled pieces, tightening down on the nuts.

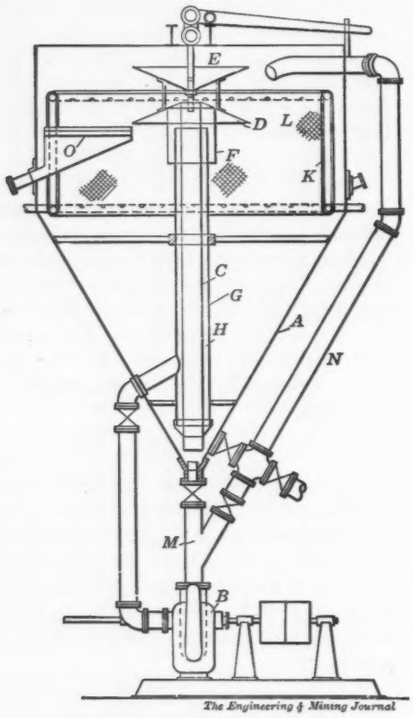
*Excerpts from a paper read before the Northern Engineering Institute, New Castle, N. S. W.

†Newcastle, N. S. W.

Agitating Apparatus for Slimes

In U. S. patent 951,742, March 8, 1910, J. E. Rothwell and R. P. Akins, of Denver, describe an apparatus for agitating pulp or solutions in the treatment of ore. The inventors have assigned their patent to the Colorado Iron Works Company, Denver, Colo.

The accompanying illustration is a section of the apparatus which is operated as follows: When the tank *A* is filled with the desired charge, the centrifugal pump *B* is started, and the inner tube *C* is raised to allow the sand that has settled at the apex of the tank to flow into the solution discharged by the pump. The



PULP AGITATOR

mixture is forced up through *C* and is discharged between the distributing cones *D* and *E*. The coarse material settles at the bottom of the tank, while the fine slime and solution flow beneath the lower edge of the trap *F* into the annular space between it and tube *G*, next into the space *H* and is drawn from there by the suction of the pump and then forced up through the tube *C* again, carying with it the coarse material that has settled. Thus the mixture entering the pump is kept free from the sand and coarser particles, as only the slimes and solution are fed to it, so there is little wear on the runner and the interior.

A decanting filter *K* surrounds perforated pipes *L*, with outlets for drawing off the filtrate, to thicken if necessary the charge in the tank. By means of the vane *O* and its flow pipe a proportional quantity of the charge may be transferred to an adjoining similar tank. By closing the valve in *N*, the discharge from the pump may be diverted into the auxiliary pipe *M* when it is desired to wash the solids from the interior of the filter.

Iron Occurrences in the Eastern Half of the United States

The accompanying map shows the distribution of iron ore in the eastern and central portion of the United States. In the tabulated list which follows the reference number to the map, district, variety of ore and number of mines active during 1908 in each district are given in sequence. This map was compiled and recently published by the U. S. Geological Survey. The bulletin also included in the ore occurrences listed those in the western portion of the United States, but only such as are shown on the map are here mentioned.

NEW ENGLAND.

1—Central Vermont, mountain and valley brown ore	0
2—Berkshire Hills, mountain and valley brown ore	2
3—Salisbury, mountain and valley brown ore	1
4—Iron Mine Hill, titaniferous magnetite	0

NEW YORK.

1—Lyon mountain, nontitaniferous magnetite	1
2—Saranac valley, nontitaniferous magnetite	0
3—Arnold hill, nontitaniferous magnetite	0
4—Split Rock mountain, titaniferous magnetite	0
5—Little Pond, titaniferous magnetite	0
6—Mineville-Port Henry, nontitaniferous magnetite	7
7—Hammondville-Crown Point, nontitaniferous magnetite	0
8—Lake Sanford, titaniferous magnetite	0
9—Minerva, nontitaniferous magnetite	0
10—Fort Ann, nontitaniferous magnetite	0
11—Northwestern New York, red hematite	1
12—Lawrence county, nontitaniferous magnetite	1
13—Port Leyden, titaniferous magnetite	0
14—Salisbury, nontitaniferous magnetite	0
15—West-Central New York, Clinton hematite	8
16—Columbia and Dutchess counties, mountain and valley brown ore	0
17—Southeastern New York, nontitaniferous magnetite	2

NEW JERSEY.

1—Northern New Jersey, nontitaniferous magnetite	10
1—Northern New Jersey, brown ore	1

PENNSYLVANIA.

1—Central Pennsylvania, Clinton hematite	8
1—Central Pennsylvania, Oriskany brown ore	4
2—Lehigh Valley, mountain and valley brown ore	9
3—Durham, nontitaniferous magnetite	0
4—Rittenhouse gap, nontitaniferous magnetite	0
5—Wheatfield-Boyertown, Cornwall magnetite	0
6—Reading, mountain and valley brown ore	0
7—Honeybrook, mountain and valley brown ore	0
8—Chestnut hill, mountain and valley brown ore	0
9—Lancaster county, mountain and valley brown ore	0
10—Lebanon county, mountain and valley brown ore	0
11—Cornwall, Cornwall magnetite	1
12—Dauphin county, mountain and valley brown ore	0
13—Hummelstown, Cornwall magnetite	0
14—Cumberalnd and Franklin counties, mountain and valley brown ore	0
15—Dillsburg, Cornwall magnetite	0
16—York county, mountain and valley brown ore	2
17—Western Pennsylvania, bedded iron carbonate	0

MARYLAND.

1—Ebbvale, mountain and valley brown ore	2
2—Frederick county, mountain and valley brown ore	1
3—Muirkirk, cretaceous iron carbonate	0

OHIO.

1—Hanging Rock, bedded iron carbonate	11
2—Eastern Ohio, bedded iron carbonate	0

KENTUCKY.

1—Hanging Rock, bedded iron carbonate	0
2—Bath county, bedded iron carbonate	0
2—Bath county, Clinton hematite	1
2—Bath county, Oriskany brown ore	0
3—Trigg county, Mississippian brown ore	1

WEST VIRGINIA.

1—Harpers Ferry, mountain and valley brown ore	1
2—Central West Virginia, bedded iron carbonate	0
3—Monroe and Greenbrier counties, Oriskany brown ore	1

VIRGINIA.

1—Great North mountain, Oriskany brown ore	0
2—Massanutten mountain, Oriskany brown ore	0
3—Blue Ridge, mountain and valley brown ore	4
4—Buchanan-Blue Ridge Springs, Cambrian specular hematite	3
5—James River Valley, specular hematite	0
6—Alleghany county and vicinity, Oriskany brown ore	7
6—Alleghany county and vicinity Clinton hematite	1
7—Giles county, limestone magnetite	0
8—Pittsville, nontitaniferous magnetite	1
8—Pittsville, Gossan ore	1
9—Franklin county, nontitaniferous magnetite	0
10—Patrick county, nontitaniferous magnetite	0
11—Carroll county, Gossan ore	0
12—Floyd county, Gossan ore	0
13—New River, mountain and valley brown ore	24
13—New River, Oriskany brown ore	3
14—Washington county, limestone magnetite	1
15—Lee and Wise counties, Clinton hematite	1

TENNESSEE.

1—Western Tennessee, Mississippian brown ore	10
2—Goodlettsville, red hematite	2
3—Rockwood, Clinton hematite	5
4—LaFollette, Clinton hematite	5
5—Eastern Tennnessee, mountain and valley brown ore	6
6—Ducktown, Gossan ore	4
7—Sylco creek, mountain brown ore	0
8—Chattanooga, Clinton hematite	1

NORTH CAROLINA.

1—Ashe county, nontitaniferous and titaniferous magnetite	0
2—Cranberry, nontitaniferous magnetite	1
2—Cranberry, specular hematite	0
3—Greensboro, titaniferous magnetite	0
4—Kings mountain, nontitaniferous magnetite	0
5—Cherokee county, mountain brown ore	0

SOUTH CAROLINA.

1—Yorkville, nontitaniferous magnetite	0

GEORGIA.

1—Estelle, Clinton hematite	1
2—Tunnel hill, mountain and valley brown ore	0
3—Ellijay, mountain and valley brown ore	1
4—Sugar valley, mountain and valley brown ore	0
5—Big Texas valley, mountain and valley brown ore	0
6—Rome, valley brown ore	0
7—Cartersville, mountain and valley brown ore	6
8—Cedartown-Rock Run, valley brown ore	6
9—Chalybeate, brown ore	1

ALABAMA.

1—Russellville, Mississippian brown ore	3
2—Gadsden, Clinton hematite	7
3—Birmingham, Clinton hematite	7
4—Talladega, Cambrian specular hematite	
5—Cedartown-Rock Run, mountain and valley brown ore	3
6—Anniston-Ironaton, mountain and valley brown ore	5
7—Woodstock, mountain and valley brown ore	6
8—Champion, mountain and valley brown ore	1
9—Ocampo-Shelby, mountain and valley brown ore	2

LAKE SUPERIOR DISTRICT.

1—Vermilion, pre-cambrian hematite	6
2—Gunflint, pre-cambrian magnetite	0
3—Mesabi, pre-cambrian hematite	89

4—Cuyuna, pre-cambrian hematite..... 0
5—Penokee-Gogebic, pre-cambrian hematite 20

MARQUETTE.

6—Marquette, pre-cambrian hematite.... 21
7—Swanzy, pre-cambrian hematite..... 3
8—Republic, pre-cambrian hematite..... 1

MENOMINEE.

9—Crystal Falls, pre-cambrian hematite 8
10—Metropolitan, pre-cambrian hematite. 8
11—Iron River, pre-cambrian hematite... 9
12—Menominee, pre-cambrian hematite.. 9
13—Florence, pre-cambrian hematite..... 1
14—Baraboo, pre-cambrian hematite..... 1
15—Spring Valley, bog ore..... 1
16—Iron Ridge, Clinton hematite..... 0

IOWA.

1—Waukon, brown ore..... 0

MISSOURI.

1—Callaway, carboniferous red hematite 0
2—Moselle, Ozark brown ore..... 0
3—Irondale, Ozark brown ore..... 0
4—Iron Mountain-Pilot Knob, specular porphyry hematite..... 1
5—Ozark, specular sandstone hematite.. 4
6—Ozark, Ozark brown ore..... 7
7—Osage river, Ozark brown ore..... 1

LOUISIANA.

1—Northwestern Louisiana, Claiborne brown ore..... 0

TEXAS.

1—Northeastern Texas, brown ore..... 3
2—Central Texas, nontitaniferous magnetite 0

The Engineering & Mining Journal

MAP SHOWING THE DISTRIBUTION OF IRON ORE IN EASTERN HALF OF THE UNITED STATES

American Chemical Society at San Francisco

SAN FRANCISCO CORRESPONDENCE

The forty-second meeting of the American Chemical Society was held at San Francisco, Cal., July 12 to 16 inclusive. A special train was made up at Chicago on July 4 for the eastern members of the society. Leaving Chicago, the party stopped at a number of important places in Colorado, Arizona, and southern California.

The special train carrying delegates to the convention was wrecked at Rocky Point between Metz and King City, Cal., on the coast line of the Southern Pacific, 36 miles south of Salinas. The engineer and the fireman were both killed. The convention party made up of prominent chemists throughout the United States escaped with only a few slight injuries.

General Meeting

July 13 was devoted to registration and a general meeting. The session opened with an address of welcome by a representative of the California section, to which President Bancroft made reply. The following papers were presented and discussed at this session:

"Positive Photography," by W. D. Bancroft.

"Liquid Ammonia as a Solvent and the Ammonia System of Acids, Bases and Salts," by E. C. Franklin.

"Chemistry in the Bureau of Standards," by W. F. Hillebrand.

"The Use of Sodium Benzoate as a Preservative of Food," by H. E. Barnard.

Session of the Industrial Division

At this meeting, held July 14 the smelter-smoke problem was the principal topic of interest. Papers relating to it were read by W. C. Ebaugh, F. G. Cottrell, Charles Baskerville, and Edmund O'Neill, and a general discussion followed. Professor Cottrell illustrated his talk with many slides, which showed the electrical devices constructed at Berkeley for doing away with smoke, and the results accomplished at the plant of the Selby Smelting and Lead Company. Professor Ebaugh, of the University of Utah, read a paper on the neutralization and filtration of smelter smoke. A paper sent by Charles Baskerville, of New York, concerning smoke in cities was also read and discussed. This paper covered the history and legal aspect of the smoke question.

Among the papers presented at the industrial division may be mentioned the following:

"Scum or Efflorescence on Brick," by A. F. Greaves-Walker.

"The Composition of Solids Precipitated from the Atmosphere during a 'Salt Storm,'" by W. C. Ebaugh.

"The Influence of Varying Quantities of Litharge in an Assay Charge," by Kenneth Williams.

"Problems in Industrial Chemistry," by J. T. Baker.

"The Scientific Use of Crude Petroleum as a Source of Power," by Leon Labonde.

"Alloys of Nickel and Cobalt with the Metals of the Chromium Group," by Elwood Haynes.

"Factors Affecting the Electrolytic Method for the Determination of Copper in Ores," by W. C. Blasdale.

"Rust as an Accelerator in the Corrosion of Iron and Steel," by W. D. Richardson.

"The Electrolytic Determination of Zinc in Ores," by George Kemmerer.

"Rapid Estimation of Available Calcium Oxide in Lime Used in Cyanide Work," by L. W. Bahney.

Division of Physical and Inorganic Chemistry

At the session of the Physical and Inorganic Chemistry Division, a number of papers were read and discussed. Frank K. Cameron, of Washington, presented a valuable paper on a study of the solubility of soils.

At this session, W. D. Bancroft, president of the society, described his new method of salvaging sulphated storage cells, which will be of much practical use. When electric storage battery cells become sulphated, they ordinarily are thrown away, and if they can be utilized, a great saving is to be effected. Mr. Bancroft's regeneration process makes them quite as good as new. Among the papers which were presented at this division may be mentioned the following:

"Stratification in Suspensions," by F. K. Cameron and E. E. Free.

"The Rate of Consolidation of Kaolin Precipitates," by F. K. Cameron and E. E. Free.

"The Action of Alkalis on Kaolin Suspensions," by F. K. Cameron and E. E. Free.

"The Temperatures of the Carborundum Furnaces," by Wilder D. Bancroft.

"Salvaging Sulphated Storage Cells," by Wilder D. Bancroft.

"An Exact Electrolytic Method for Determining Some Metals," by W. L. Perdue and G. A. Hulett.

"The Solubility of Strontium Nitrate in Solutions of Strontium Hydroxide," by C. L. Parsons and C. L. Perkins.

"Comparative Analyses of Water from Great Salt Lake," by Wallace MacFarlane.

"Improvements in Molecular Weight Determinations by the Boiling Point Method," by L. B. Shipley and J. O. Ziebolz.

"The Influence of Organic Liquids upon the Interaction of Hydrogen Sulphide and Sulphur Dioxide," by David Klein.

"Some Interrelations of the Carbide and Nitride of Magnesium," by F. G. Cottrell.

"Rapid Determination of Mercury, Silver, Bismuth and Copper by means of Stationary Electrodes," by R. C. Benner.

"A Rotating Graphite Anode," by J. W. Turrentine.

"Apparatus for the Determination of Arsenic," by Otis D. Swett.

"Mechanical Stimulus to Crystallization," by S. W. Young.

"Conductivity of Some Solutions in Ammonia Water Mixtures," by Wm. H. Sloan.

"Cuprous Nitrate," by Wm. H. Sloan.

Sessions of Other Divisions

At the Division of Agricultural and Food Chemistry 33 papers were presented, dealing with various phases of agricultural and food chemistry. Under the Division of Organic Chemistry, 10 papers were also read and discussed. Under the Division of Pharmaceutical Chemistry; 10 papers were presented.

Excursions and Entertainments

On July 14 an excursion was made to Mt. Tamalpais, and the Muir woods. The night was spent at the tavern on the summit of the mountain. Early Thursday morning the party returned by special steamer, to Berkeley. On July 15, a special train and steamer conveyed the party to the plant of the Selby Smelting and Lead Company.

There was also a special steamer trip around the bay at San Francisco and out through the Golden Gate. A trip through Chinatown was also one of the features of the Friday entertainments. Saturday was spent automobiling through the city to Golden Gate Park, the Cliff and the Presidio. On Sunday, July 17, there was an excursion to the Italian Swiss colonies at Asti, where an opportunity was given to see one of California's most productive valleys at a time when the vineyards are at their best. On July 18 a steamboat excursion was given up the Sacramento river and return by rail.

After the San Francisco entertainments were concluded, a short visit was made to the Puget Sound country.

Minerals on the Line of the Grand Trunk Pacific

A detailed official statement respecting the mineral wealth of the country now being opened up by the construction of the Grand Trunk Pacific railway, west from the Edmonton to Prince Rupert, B. C., has been issued from the headquarters of the company. It states that the first true coals along the line are found in the Pembina, Brazean and Big Horn field. Here bituminous coal of a high grade has been discovered, and boring shows some of the seams to be thick. Several large properties are are to be developed. The Kanasaski Coal Company, the German Development Company and the Canadian Northern Railway Company—a line that will also strike for the Yellowhead—have done prospecting work and conditions are good for the working of the seams. The next valuable seams are in the Yellowhead Pass and adjacent thereto. Here bituminous coal of 30 and 40 ft. in thickness is found, and owing to the mountainous country they pitch considerably. The Grand Trunk Pacific, the O'Brien interests of Cobalt and other concerns are getting to work. Along the Fraser river some high-grade coal is in evidence, especially on the Bear river, where seams of good showing have been located. On the Telkwa river the Kitimat Development Syndicate, the Transcontinental Exploration Syndicate and the Cassiar Coal Company have properties. The Telkwa coal is of anthracite quality, five or six feet thick and lies in fairly undisturbed ground. In this region coal also outcrops at Driftwood creek, Morricetown, on the Zymoter or Copper river, on the Goldstream, and along other creeks and rivers. Placer gold mining is active over most of this country, but quartz mining has received little attention. The Guggenheim Exploration Company has properties in the Cariboo. At Hazelton a good galena vein has been struck, and past this district many discoveries of ore and placer gold have been made in the Skeena country. Iron, zinc, platinum, gypsum and building stone are found in this region, to the north of which oil has been struck. In the Prince Rupert country a group of Canadian and American capitalists control an area of about 5000 acres containing gold, silver, lead and copper. In the new mining district opened up to the north of Prince Rupert on the Portland canal, near the Alaska boundary, the principal camp attracts widespread attention, the Provincial government having in a single day sold half a million dollars worth of lots. The vein in which mineral is found has already been tested for 20 miles, and mineral experts declare that this district is a mineralized mountain range. Surface indications show that in places an entire mountain side will sell for the mineral values.

The whole of the country north of a line drawn from Hazelton to Lesser Slave lake is practically unprospected, but has every appearance of being rich in minerals. A 50-ft. seam of coal outcrops as far north as the Mackenzie river, and a natural gas and oil belt exists north of Lesser Slave lake. Operations have hitherto been practically prohibited, owing to the isolation of the country and the heavy cost of taking in material. But the advent of the Grand Trunk Pacific, which invades the heart of the rough country, is expected to begin an era of real development for the Canadian Northwest.

The Situation in Alaska

SPECIAL CORRESPONDENCE

With the election of J. H. Young as president of the Northwestern Commercial Company, and of the Alaska Steamship Company, all of the Morgan-Guggenheim interests in Alaska will be administered from Seattle, including the steamships, the Copper River railroad, and the copper mines in the Copper River basin and on Latouche island in Prince William sound. S. W. Eccles. J. M. Young, M. R. Guggenheim, D. H. Jarvis and Stephen Birch are among the directors. The Seattle holdings are not represented in the directorate.

Trains on the Copper River railroad are now running from Cordova to the steamer landing at mile 104 on the Copper river and by Jan. 1, it is expected that trains will be in operation to the Bonanza mine terminal, 195 miles from Cordova. The tramway from the Bonanza mine to the terminal has already been built, and by the time the railroad is completed, several thousand tons of copper ore will be ready for shipment. It is expected that the government will have the winter trial finished from Copper Center to Chitina, 35 miles, and travelers to Fairbanks can then go by this route, thus avoiding the two high summits on the Valdez trail. The railroad is now within 28 miles of Chitina, which promises to be the most considerable town in the interior. Telegraph and telephone lines have already been established connecting with Cordova. According to Stephen Birch, the ore from the recently acquired Beatson copper mine on Latouche island will be taken to Cordova and there transshipped to the Tacoma smeltery. On the opening up of Alaskan coal mines, a smeltery may be built in Alaska for the treatment of local ores.

The railroad from Katalla to the Bering River coalfield has already been partially built, and could be completed in a few months. Money is appropriated for this purpose. As the Syndicate is now paying over $10 per ton for British Columbia coal, there can be no doubt of the intention of completing the coal road as soon as the Department of the Interior will allow the coal to be mined. The statement of President Taft at Detroit in referring to the Alaskan coalfields, that "certainly we should not shut out the present generation entirely in dealing with over natural wealth," is taken as a favorable sign by the many coal-land claimants at Katalla, Seattle and elsewhere, who are patiently waiting for patents. The report of Admiral Dewey that the Alaskan coal would be a benefit to the Navy may also act as a lever to hasten the machinery of the land office. In fact L. I. Sharp and Andrew Christensen, special agents, have already been ordered to further investigate the Cunningham and Greene claims, which led to the Ballinger-Pinchot controversy. It is reported that the boats of the Coast and Geodetic Survey will use local coal for their work in the Cook inlet region this summer, but as the coal claimants in that vicinity sell coal from their claims up for patent, it will be secured from a vein cropping out between high and low tide near Homer on Cook inlet.

A Mining Congress in Belgium

At the close of the meeting of the Congrès de la Proprieté Miniere at Nancy, France, in July, 1909, it was resolved to meet in Brussels in 1910, and at that time to celebrate the centennial of the organic mining law of 1810. That law, which has served as a model for the principles underlying so much modern legislation, is still in force and notwithstanding various attacks made upon it remains still the supreme law in France, in Belgium and in Holland. The principal subjects to be considered at this year's meeting, which will be held in Brussels, Belgium, Sept. 15-17, include papers on the basis of mining property; the management, opening and control of mines; labor in mines; coöperative work and ownership; accidents and safety apparatus; miner's dwellings; the diseases to which miners are especially liable and their remedies; mining legislation in foreign countries and in European colonies; and the unification of mining legislation in different countries. In addition to this there will be some historical papers on the law of 1810 and on the outgrowth of mine legislation from it. The general secretary of the Congress is Emile Didier, 23 Rue d'Amiens, Lille, Belgium.

It may be added that the international exposition at Brussels, which will be open at the time of the Congress, will show the progress of the mining industry grouped in a systematic manner. Instead of exhibitions of particular mines as at former affairs of this kind, there will be a general exhibit showing the growth of the mining industry.

The Tuolumne-North Butte Controversy

In order to properly set forth its position in the suit recently commenced against it by the North Butte Mining company, the directors of the Tuolumne Copper company have prepared and submitted for the information of the general public the following statement accompanied by diagrams prepared from the accepted survey:

"The recent suit brought by the North Butte Mining Company against the Tuolumne Copper Mining Company and the comments made thereon by newspapers friendly to the plaintiff have in some instances misled the public as to the exact nature of the controversy. When the Jessie owners made aplication for patent in 1882, the owners of the Tuolumne, being the older location, filed an adverse suit claiming part of the ground embraced in the Jessie lode. Instead of litigating this question the owners of the both claims arrived at a settlement or compromise, by which the boundary line of both the claims was agreed upon and fixed. The Jessie owners surrendered a strip of ground claimed by the Tuolumne and deeds were executed in 1882, conveying this strip by the Jessie owners to the owners of the Tuolumne, by which conveyance this strip, called the compromise strip, became part of the Tuolumne claim, although patented by the Jessie. This compromise strip, with the balance of the Tuolumne lode, was held by the Tuolumne owners until 1906, when the Tuolumne Mining Company was incorporated and became vested with the full title to the Tuolumne lode, including this compromise strip, and the entire property has been held and operated ever since by the company.

North Butte's Interest in the Compromise Strip

"In September, 1909, John G. Moroney, for the North Butte Mining Company, purchased for a nominal consideration an alleged three-eighths interest in this compromise strip from a former owner who claimed that this interest had not passed on account of a faulty description in his prior deed. Moroney deeded this interest to the North Butte, which holds the same for litigation purposes, and without any right to any interest therein. All the ore that has been or is now being mined by the Tuolumne company is from this compromise strip. In the suit instituted by the North Butte Mining Company the plaintiff does not claim that it has any apex rights in this strip, but only founds its claim on the three-eighths interest acquired by Moroney. It admits the ownership of the Tuolumne company in an undividing five-eighths interest in this strip. The plaintiff claims apex rights in the Tuolumne claim lying south of this compromise strip, but there has been no ore extracted from this portion of the property and the contention of the defendant is that there is no foundation in law or in fact for any claim on the part of the North Butte Mining Company to any portion of the veins in defendant's property, wherever situated. The complaint asks for a temporary injunction, but as yet no order to show cause has been issued nor any time set for hearing of plaintiff's application in this regard."

Conditions at the North Butte Mine

A report on the conditions and developments during the first six months of 1910 at the North Butte mine, Butte, Mont., has just been issued for the benefit of stockholders in the North Butte Mining Company. President James Hoatson states that since the issuance of the annual report the company has acquired the remaining outstanding interests in the Crœsus and West Gem claims, and also the westerly end of the Sioux Chief claim. The Crœsus claim was purchased by the issuance of 10,000 shares of the treasury stock of the company, and the West Gem and Sioux Chief interests were acquired by exchanging the Gem mill site claim and certain fractional interests in other claims which were not considered of much value to the North Butte company. The report of James D. Pope, general manager of the company, sets forth the developments at the mine in the period under consideration as follows:

Shaft Work

In the Speculator shaft a sinking station was cut on the 2000 level in April and May, and the shaft was sunk 72½ ft. in June, giving a total depth of 2319½ ft. The cutting of a station on the 2400 level is stated to be in progress and it is planned to resume work on the shaft as soon as this is completed, sink it 400 ft. deeper, cut the 2600 and 2800 stations and open these two levels simultaneously.

The Granite Mountain shaft has been connected from the surface to the 700 level, and the raise under this shaft has been completed from the 1200 to the 1000 level. Raising to connect with this shaft is also in progress from the 1000, 1600 and 1800 levels. A total of 696 ft. have been raised from the various levels under the shaft.

Work on the Edith May Vein

On June 30 the winze on the Edith May vein was down 77½ ft. below the 2200 level. It showed ore for a depth of 50 ft., at which depth the ore dipped flatter than the winze, throwing the winze into the foot-wall so that for the last 27 ft. ore only showed on one side of the winze. The ore in the winze has averaged from 5 to 10 ft. in width and has assayed from 5 to 12 per cent. copper, practically all of it being of better than 6 per cent. grade. The winze will be continued to the 2300 level before the ore is crosscut. The only other development on this vein has beeen the eastward extension of the drift on the 2000 level, and is stated to have proved ore to extend without break to the east property line. The ore is from 5 to 7 ft. wide, assaying from 3 to 7 per cent. copper.

Operations on the Jessie Vein

A crosscut south from the 700 level of the Gem mine has encountered ore below the old stopes of the Jessie mine, and drifts have been extended 65 ft. on this ore without finding its boundaries. The ore shows from 8 to 15 ft. wide and assays from 4½ to 9½ per cent. copper and 7½ to 17 oz. silver per ton. It is figured that 36,820 tons of ore averaging 6.8 per cent. copper and 11.7 oz. silver per ton have been developed. The 1000 level has been retimbered and connections with the orebody above described will be made as rapidly as possible. The 1700 level has been extended west 203 ft. and has opened up a fine body of ore to the west of the present stope. The ore ranges from 10 to 16 ft. in width and averages from 3½ to 9½ per cent. copper. The 1800 drift has been extended west under this and has encountered the same orebody, which apparently dips to the west. On the 2000 level drifts have been extended both east and west until 511 ft. have been opened on the vein, which shows an average width of 10 ft. assaying over 5½ per cent. copper. The face of the east drift now shows 20 ft. of ore, assaying 5½ per cent. copper. The west drift has just encountered poor ground. On the 2200 level the ground is badly faulted and the east drift has been stopped for the present at a distance of 313 ft. from the crosscut, but the west drift now 80 ft. long, is being extended to prove the ore found in the 1800.

Development of the South Gem Vein

The 1800 drift on the South Gem vein has run out of ore about 300 ft. west of the crosscut, up to which point the ore averaged about 6 per cent. copper, varying in width from 1 to 6 ft. The 2000 drift has been driven 260 ft. west, showing, for 150 ft. of this distance, 4 ft. of ore assaying 4½ per cent. copper and 5 oz. silver per ton. The drift on the 2200 level is being extended west to encounter this orebody.

Crosscutting has been begun to extend the 1800, 2000 and 2200 levels under the Crœsus claim. On the 1800 a vein has been encountered which is not believed to be the main Crœsus vein, but which showed 5 ft. of ore, assaying 5 per cent. copper and 5 oz. silver per ton in the crosscut. Drifting on this it narrowed

to 1 ft. in width going east and 2 ft. going west, in a distance of 15 ft. The ore is of a different character from any copper ore previously developed in the North Butte mine, as it consists of a heavy pyrite containing enargite and showing a good deal of rhodochrosite, which is not generally found in connection with copper ore in Butte. The drifts are being extended both east and west on this vein and the crosscut is also being driven to the north. The crosscuts on the 2000 and 2200 levels are not yet far enough north to reach this vein.

Production and Development Summarized

During the first six months of 1910 the following development work has been done: Speculator shaft, 72½ ft.; Edith May winze, 77½ ft.; crosscuts, 2582 ft.; drifts, 4321 ft.; raises, 1712½ ft.; total, 8765½ ft. There have been mined and shipped 203,904 tons of ore as follows: First class, 20,284 tons; second class, 183,521; precipitates, 74; leaser's ore, 25 tons.

The work of cutting a sinking station and sinking the Speculator shaft has interfered with the extraction of ore, and the tonnage mined has been considerably less than it could have been had this work not been done. This work and the large amount of other development work carried on, including work on the Granite Mountain shaft, has also largely increased the expense during this period. Ore in sight in the various levels and stopes is stated as follows: Edith May vein, 649,720 tons; Jessie vein, 233,710; Speculator vein, 4100; Adirondack vein, 8000; South Gem vein, 7650; Crœsus vein, 1360; total, 904,540 tons, of an average grade of 4¼ per cent. copper and 3 oz. silver per ton. The increased value in silver over the value shown on Jan. 1, 1910, is due to the increased tonnage shown by the Jessie vein and the Gem and Crœsus veins to the north of the Jessie.

The development work which it is planned to do during the next three months will include sinking the Speculator shaft and cutting a station on the 2400 level; sinking the Edith May winze to the 2300 level and drifting on that level on the Edith May vein; crosscutting the Crœsus claim on the 1800, 2000 and 2200 levels and drifting on the veins found by these crosscuts; developing the west end of the Jessie vein on the 1800, 2000 and 2200; drifting on the South Gem vein on the 2000 and 2200 levels; drifting east on Edith May vein on the 2200-ft. level, and, if possible, without hindering the production of ore, crosscutting to the Adirondack vein on the 2000 and 2200 levels. The work on the Granite Mountain shaft will be continued and necessary work will be done in connection with the Tuolumne controversy. Both the North Butte and Tuolumne companies have done much work to prove their positions regarding the ownership of the Jessie fraction a three-eighth interest of which, and of all ores mined therefrom, is claimed by the North Butte Mining Company.

The Directorship of the Bureau of Mines

Washington Correspondence

Director George Otis Smith, of the Geological Survey, now chief of the Bureau of Mines, *ad interim*, has dictated the following authorized statement in response to the criticism relating to his campaign for the appointment of E. W. Parker, of the Geological Survey as head of the Bureau of Mines:

"Newspaper comment on my indorsement of a candidate for the directorship of the Bureau of Mines has been called to my attention. No secrecy has been sought by me regarding this action or activity. In bringing the candidacy to the attention of friends, I have acted entirely in a personal and not official way, but, of course, I appreciate that I cannot divorce my official position from whatever I might wish to do simply in a personal way. Moreover, I realize that my interest in the organization of the Bureau of Mines, and in the inauguration of its work as an independent bureau, is largely actuated by official connection with this work for three years while it has been under my supervision, and by reason of my position as director of the coördinate bureau in the same department.

"Criticism of my interest in the selection of the director of the Bureau of Mines might have been avoided had I simply indorsed another candidate, whose friends have since been outspoken in their criticism of my action as taken. The reason for following the dictates of my own judgment as well as the counsel of my associates in the Survey came wholly from a desire to insure for the new bureau at the outset such policy and procedure as conform to my ideas of the best type of governmental administration. Being well acquainted with the two candidates, I naturally and properly indorsed the one whom I considered was better qualified to serve what I regard as the best interests of the Bureau of Mines and of the public."

It has become known here that Mr. Smith's telegraphic campaign in behalf of E. W. Parker was carried on by the sending of messages of which the following is a type:

"Peter B. Scotland, Clifton, Ariz.:

"Urge endorsement to President of Edward W. Parker, now chief, mineral resources, Geological Survey, for director Bureau of Mines. Several prominent engineers refuse to be candidates. I believe appointee should be one under whom new bureau will and can coöperate with Survey. Parker has support of Hays, Lindgren, Campbell, Brooks, and other survey associates.

"George Otis Smith."

Telegrams of a similar nature were sent to a large number of persons.

Pig Iron Production in 1910

The American Iron and Steel Association has collected and published the complete statistics of the production of pig iron for the first half of the year 1910. This production was the largest ever reported in a similar period. The following table shows the make of pig iron in the United States for four years past, in long tons:

	First Half.	Second Half.	Year.
1907	13,478,044	12,303,317	25,781,361
1908	6,918,004	9,018,014	15,936,018
1909	11,022,346	14,773,125	25,795,471
1910	15,012,392	.....	.....

The increase in production in the first half of 1910 as compared with the second half of 1909 was 239,267 tons, or 1.6 per cent.; as compared with the first half of 1909 it was 3,990,046 tons, or 36.2 per cent. In the first half of 1910 we exceeded by 1,223,150 tons the production of the whole year 1900, when 13,789,242 tons were made.

The production classified according to the uses for which the iron was intended, is given in the following table, comparison being made with both halves of the year 1909:

	1909		1910.
	First Half.	Second Half.	First Half.
Foundry and forge	2,989,319	3,398,314	3,385,068
Bessemer pig	4,472,482	6,084,088	6,323,883
Basic pig	3,297,581	4,952,644	4,953,810
Charcoal iron	171,389	204,614	219,653
Spiegel and ferro	91,575	133,465	129,978
Total	11,022,346	14,773,125	15,012,392

The bessemer production in the first half of 1910 includes 118,466 tons of special low-phosphorus pig. The production of spiegeleisen was 84,602 and of ferromanganese 45,376 tons. Charcoal iron includes a few tons made in the electric furnace. As compared with the second half of 1909, bessemer pig showed an increase of 239,795 tons, or 3.9 per cent.; while basic was practically stationary, the increase being only 1166 tons. This is rather a reversal of recent movements.

The production classified according to fuels used was as follows for the first half of 1910.

	Tons.	Per Cent.
Coke	14,416,000	96.03
Mixed Anthracite and coke	371,957	2.48
Anthracite alone	4,782	0.03
Charcoal	219,653	1.46
Total	15,012,392	100.00

Charcoal, as above stated, includes a small quantity made in the electric furnace. Coke includes also a small quantity

made with raw bituminous coal. Practically 97 per cent. of the iron was made with coke as fuel.

The number of furnaces in blast on June 30, 1910, was 293, compared with 338 on Dec. 31 and 258 on June 30, 1909. There were 180 furnaces out of blast on June 30. There were 374 furnaces actually in blast during all or a part of the half-year. On June 30 last there were six furnaces being rebuilt, all to use coke; while 16 new furnaces were under construction, 15 intended to use coke and one charcoal.

Activity in Trinidad Oilfields

The determination of the British government to use oil for fuel on its naval vessels and the general increase in the consumption of oil throughout the world has greatly stimulated, according to United States Consul Franklin D. Hale, the exploitation of the oilfields of Trinidad. Experts from the United States and England are at present investigating the extent and character of the oilfields and exploration work is being done at a number of points on the island. Reports of marvelous new finds, etc., are a daily occurrence.

Extensive Oilfield Claimed

The attention of investigators is particularly directed toward the southern half of the island and reports from that region seem to indicate that a field from 500 to 800 square miles in extent will be proved. In all probabilities the oil-bearing region will extend below the Gulf of Paria and westward beyond the region of the 1200-acre Pitch lake, at Guanaco, which is operated by an American company, to the Gulf of Maracaibo. Should all of this territory prove oil bearing, this will undoubtedly be one of the largest oilfields in the world.

London Company Drills Wells

The holdings of the Canadian company, amounting to about 25,000 acres of oil property in the southwestern section of the island, have been taken over by a $1,500,000 company floated in London. It is stated that a dozen wells from 800 to 1400 ft. in depth have been bored with satisfactory results, and that some are already excellent producers. Efforts are, however, being made to check the flow from the wells until facilities for the exportation of the oil are completed.

American Company Producing Oil

The American company, which has operated Pitch lake, has for some time been exploring for oil and is constantly extending its operations. This company has a number of wells from 900 to 1400 ft. deep, and two steel tanks of 84,000-gal. capacity each, also land reservoirs of large storage proportions. Notwithstanding this, many thousands of gallons of crude oil have run into the sea, only a few hundred feet from the field of operation, on account of lack of adequate storage facilities.

Utah Copper Company to Curtail Production

Charles M. MacNeill, president of the Utah Copper Company, on July 26 made the following public statement in London:

"I cannot speak for any company other than the Utah Copper Company, but so far as we are concerned we are convinced by the experience of the past six months that, for the present at least, the world's consumption cannot take care of the entire production of all the mines operating at their full capacity.

"In making our production conform to the consumption, I consider that we are acting for the best interests of our shareholders and for the stability of the copper industry in general.

"It will probably not be a long time before the consumption, which is large, will be on a scale to take care of the entire production at fair prices, but until such time we shall not produce more than can be sold at a fair profit.

"Why should copper producers turn their ore reserves into the finished copper product faster than they can sell it to advantage?"

This statement means that the Utah Copper Company is going to reduce its production. As to the straightforwardness of the statement there is no question whatever.

Now that the management of the Utah Copper Company has come to this decision there is no doubt that some of the other large copper producers will follow the same policy. It is therefore now probable that there will be a reduction in copper production that will be of important effect upon the industry.

The Greene Consolidated Suit

The Greene Consolidated Copper Company, its president and directors, have entered general denials to and asked the dismissal of the suit brought against them and Thomas F. Cole, John D. Ryan, *et al.*, by Berton A. Garrett and Max Sand, two minority stockholders of the copper company. As reported by the *Boston News Bureau*, the suit alleged conspiracy, wrongful waste of assets, the abstraction of $5,000,000 from treasury funds and made other sensational charges.

Sundry Allegations Denied

The company denies the following allegations of the complainants, namely: That the ore reserves are or ever were $100,000,000; that $73,000,000 represents the assets of the Sierra Madre Land and Lumber Company as extravagantly reported by Colonel Greene, and that there was fraud in connection with the sale of 51 per cent. of the capital stock of said company, and that default on this company's bonds was premeditated by any of the defendants; that the company invested $16,291,185 in plants, mines, etc.; that Cole and Ryan control Greene Consolidated; that fraud was used in bringing about the merger of the company into the Greene-Cananea Copper Company (of the 200 shares that comprise the capitalization of the Cananea Consolidated Copper Company, operating the Greene properties, but 193 shares are held in the Greene treasury. The charter of the Greene Consolidated company, secured in West Virginia, does not permit the company to carry on a milling and reduction business; furthermore, the Greene company owns no mines); that Cananea Central was an undeveloped property and that the Greene stock, at time of merger, was worth more than Cananea shares; that the Cananea Central property was held only on option, while the purchase price did not exceed $2,500,000; that Cananea Central had not a market value of over $20,000,000 at the time of exchange; that successful mining operations were carried on, or that some of the largest orebodies in the world were opened up, or that the dividends were duly earned; that but for necessary expenditures for repairs in construction to plants and property of the Cananea Consolidated company, the property would not up to this time show any profits.

Transfer of Property

Regarding the diversion of property by the Greene Consolidated to Cananea Central "without adequate compensation," the defendants say that about July 15, 1906, the Bryan mining claim, a part of the claim known as Massey No. 2 and two mining denouncements known as Seguro and Square, were sold to Cananea Central by Cananea Consolidated for $2,000,000 (200,000 shares Cananea Central), but this was before the formation of the Greene-Cananea Company and prior to the interest of Cole and Ryan in Greene Consolidated.

The charge that a report that Greene had operated in 1907 at a loss of over $2,000,000 is denied; the shut-down in December, 1907, was effected, say the defendants, so that repairs could be made, for the price of copper was such that operations were unprofitable at that time. Since the Greene-Cananea Copper Company became a majority owner of Greene Consolidated shares, general office expenses have been less than one-third formerly paid and the cost of producing, marketing and manufacturing copper and other metals by the Cananea Consolidated Copper Company has been reduced, it is claimed, to about one-half the former costs.

Continuous Agitation System at Esperanza*

BY M. H. KURYLA †

The agitation equipment of the new cyanide plant of the Esperanza Mining Company, El Oro, Mex., consists of two batteries of six Pachuca tanks, 14 ft. 10 in. by 44 ft. 8½ in. The first battery of six tanks, locally referred to as the "upper Pachucas," treats the flocculent slime produced from the coarse crushing in 120 stamps, and is worked on the intermittent or cycle system originally installed. The site permits of a gravity discharge to the storage tanks for the Merrill filter process.

The six "lower Pachucas" treat the granular slime resulting from the regrinding of the battery sands in ten 4x20-ft. tube mills. It is with these "lower Pachucas" that this article deals.

Original Intermittent System

In the original system each tank held 80 tons dry slime and 144 tons solution (the ratio of solid to liquid being 1:1.2), and with a feed of 300 tons of dry slime per 24 hours, the time required to fill one tank was 6.4 hours. After the required length of agitation each tank was discharged through a 5-in. valve at the bottom and pulp raised to the filter-press storage tanks by means of three vertical bucket elevators.

These elevators were 54 ft. from head to boot pulleys and were made of an 18-in., 10-ply, rubber elevator belt, with 16 x7x5½-in. type AA, malleable-iron buckets, spaced 18 in. center to center. The boots were made of cast iron and provided with accessible hand holes for cleaning. The housing, 2 ft. 6 in. by 5 ft. 6 in. inside dimensions, was built from No. 12 steel, with removable doors for repairs on belts, buckets and pulleys. The original belt speed of 360 ft. per min. was raised to 540 ft. per min., to permit one elevator to be held in reserve. With the average condition of the elevators the time required to discharge one tank was about 3.8 hours.

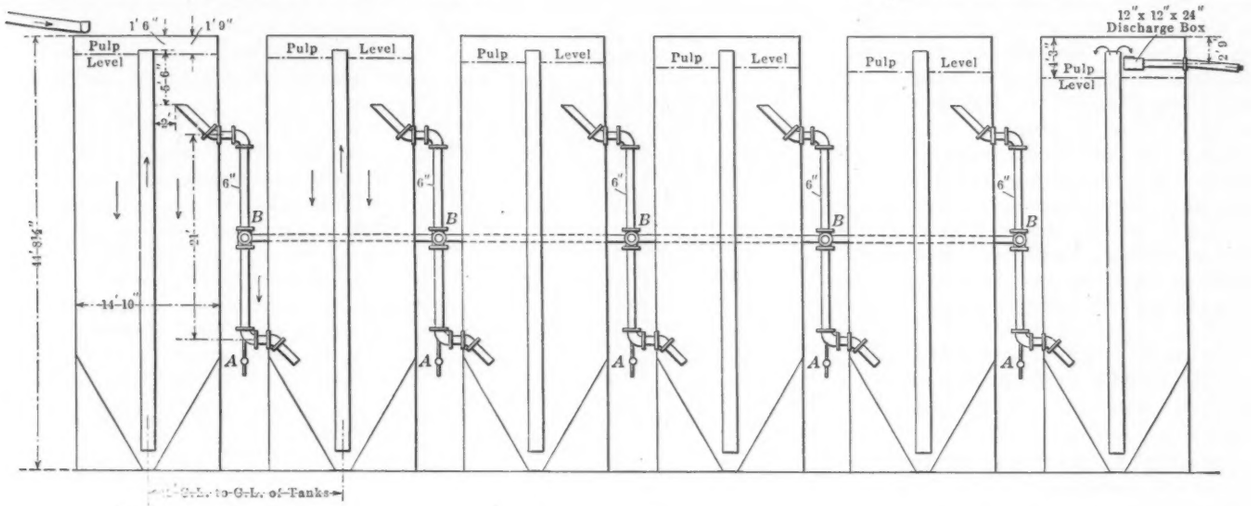
On the assumption that one-half of the filling and discharging times resulted in net agitation on the entire tank charge, the net time lost in these operations amounted to 5.1 hours. The net agitation per charge, accordingly, worked out as follows:

Total possible agitation without filling or discharging loss	38.4 hours
Loss in filling and discharging	5.1 hours
Net agitation	33.3 hours
Percentage of net agitation lost in filling and discharging	15.3 per cent.

The yearly expense connected with the operations of the three elevators figures out as follows: Three elevator belts, each 120 ft., at 6 pesos, 2160 pesos; power, 1825 pesos; regular attendance, 730 pesos; buckets and bolts, 35 pesos; repairs, labor, 1095 pesos; repairs, material (exclusive of belts), 500 pesos; total, per year, 6345 pesos.

Present Continuous System

The difficulties and expense experienced with the elevators made it highly desirable to deliver the pulp by gravity to the filter-press storage tanks (collars of the storage tanks being six feet below the collars of the Pachuca tanks, and 50 ft. distant). The 6-in. pipe connections shown in the accompanying illustration were put in Feb. 10, 1910, first as an experiment to demonstrate the applicability of the scheme. The particular information desired was with reference



Continuous System of Agitation in Pachuca Tanks at the Esperanza Mill El Oro, Mexico

RESULTS OF CONTINUOUS AGITATION AT ESPERANZA.

	Charge, Per Cent.	Discharge from Tanks. Tank No. 1, Per Cent.	Tank No. 2, Per Cent.	Tank No. 3, Per Cent.	Tank No. 4, Per Cent.	Tank No. 5, Per Cent.	Tank No. 6, Per Cent.
Sizing test of pulp:							
Over 200 mesh	14.7	14.9	15.2	15.7	15.3	15.1	14.9
Under 200 mesh	85.3	85.1	84.8	84.3	84.7	84.9	85.1
Strength of KCN solution	0.12	0.112	0.110	0.1075	0.105	0.1025	0.100
	Content, Grams.						
Gold extraction:							
Over 200 mesh	9.7	46.0	58.0	61.5	62.0	63.0	63.5
Under 200 mesh	6.0	68.0	75.5	78.0	80.0	82.0	83.5
General sample	6.7	66.0	72.5	74.5	76.0	77.0	78.0
Silver extraction:							
Over 200 mesh	75.0	9.0	16.0	22.0	26.0	28.5	31.0
Under 200 mesh	83.0	28.0	39.0	46.0	50.5	53.0	54.0
General sample	80.0	22.5	34.5	41.5	46.0	48.0	50.0

Feed and final discharge, solid to liquid ratio 1:1.8. Sampling 6 days at one hour intervals. Consumption of KCN per ton of ore, 358 grams.

Informes y Memorias del Instituto Mexicano de Minas y Metalurgia, April, 1910.

†El Oro, Mexico.

to comparative extraction and classification during agitation, as it was thought that the "sandy" product fed to the tanks might undergo considerable classification in passing from tank to tank. The temporary connections have proved so satisfactory that they have been retained in present daily operation.

The pulp is fed into the top of tank No. 1 at the rate of 300 tons dry slime and 540 tons solution per 24 hours and flows through the 6-in. pipes by gravity to the discharge box near the top of tank No. 6. The friction drop from tank to tank is about six inches, making a total drop in the level of the pulp between tank No. 1 and tank No. 6, of 30 in. However, by utilizing the central tube as an air lift, so that the overflow of the air lift will drop into the outlet, the difference in the level of the pulp in tank No. 1 and in the final discharge tank is reduced to 12 in. In fact, were it desirable to have the final discharge at a higher level than the first tank, the air lift in the last tank of the series could be raised sufficiently to permit of this being done (at an additional consumption of air, of course).

The intake into a tank being near the bottom, the pulp rises through the air lift, as the current in the annular space around the air lift is in a downward direction. The discharge from the tank is placed seven feet below the collar of the tank and two feet from the side of the air lift, in this way "sampling" the overflow of the air lift and producing a practically uniform transfer of pulp from tank to tank, as shown in the accompanying table.

The gain of extraction in the continuous system as compared to the intermittent is 1.3 per cent. of gold and 1.5 per cent. of silver, and the saving in cyanide of 25 grams per ton of ore. The saving in operating labor and the increase in length of agitation effected in the "lower Pachucas" has made it advisable to install the continuous system in the "upper Pachucas," which discharged by gravity to the filter-press storage tanks.

Novelties in Copper Metallurgy

The Balaklala Copper Company is going to introduce the Cottrell process for the treatment of smelting smoke, which is already in successful use at the Selby works.

The Braden Copper Company is going to introduce at its mines in Chile the process of roasting its concentrate, making sulphuric acid, leaching the roasted ore with the acid and precipitating copper electrolytically. Experiments on a large scale are considered to have demonstrated the feasibility and material advantage of this process. The Wedge furnace will be used for roasting.

Electrolytic Refining of Bullion in the United States Mints*

By H. J. Slaker.

The methods of refining gold and silver bullion in the Government institutions have been radically changed in the last 10 years. The parent mint at Philadelphia has evolved electrolytic methods which are economical and efficient.

The problem confronting the Government refineries is to separate the noble metals in a pure state from bullion containing a mixture of gold, silver and base metals in all proportions. As the material varies greatly, the operations in the mint refinery differ from those employed in private plants. In fact, the system in use is a double one, whereby in the first step the silver is brought up to purity, and in the second, the gold. This explains the term "silver" and "gold cells."

Silver Refining

The electrolyte for the refining of silver is composed of a 2 per cent. solution of silver nitrate with about 2 per cent. of free nitric acid, held in large stoneware tanks, sixteen of which are in series across the line voltage, each cell thus requiring somewhat less than one-volt pressure. The anodes consist of 40 per cent. gold, about 47 per cent. silver and the remainder base metal. This has proved the most suitable proportion for the extraction of the greatest percentage of silver from the anodes. The mixture is melted, thoroughly stirred and cast into ingots, which are slipped into a bag and hung in the electrolyte by means of a small gold hook. The bag prevents the cathode from coming into contact with the anode and thus picking up small amounts of gold.

Good contact is maintained by using the gold hooks for suspending the anodes, and these hooks in turn are in contact with thin silver strips half rounded along a hard-rubber tube which is reinforced through the center by a steel rod. The silver strips carry the current from one cell to the next and distribute it through the gold hook to the anode. On account of the large percentage of base in the anode, a current density of from 5 to 7 amperes per sq.ft. is used. Every eight hours, each cathode is removed to scrape off the loosely adhering crystals; the same cathode, however, is used until it becomes too heavy.

The relative amount of silver nitrate in the electrolyte must be kept practically constant to secure a reguline deposit of silver. As the current dissolves both silver and base metal at the anode, but deposits only silver at the cathode, the strength of the silver nitrate is depleted and has to be replenished from time to time and finally the foul solution has to be replaced by new in order to insure a good deposit.

Treatment of the Electrolyte

The foul electrolyte is pumped into stoneware tanks, where, with insoluble iron anodes, the silver content is reduced to a small amount by the electric current, after which the remaining silver is precipitated as chloride by sodium chloride; the solution is allowed to pass off to the sewer. Upon the anode surface, lead peroxide gradually forms, thus protecting the iron, and this proceeds until sufficient weight is gathered when the anode is easily removed and the deposit knocked off. This black deposit contains small amounts of silver peroxide and traces of palladium peroxide which are regained from the metallic lead after reduction by carbon in a small blast furnace. The product from the silver cells rarely runs below 99.9 per cent. fine, and generally will carry less than one ounce of gold to 100,000 oz. of silver.

Gold Refining

The worked-out anodes from the silver cells are generally the anodes for the gold cells, but, of course, any deposit, if fine enough, can be put directly into these cells. They are suspended in an electrolyte composed of 10 per cent. hydrochloric acid and about 3 per cent. of gold, as gold chloride.

The jars used are of Royal Berlin porcelain set in a sand bath heated by steam so that the temperature in the electrolyte is about 125 deg. F. The circulation is accomplished by means of small hard-rubber propellers driven at 700 r.p.m. by a belt from an electric motor. A current density of 70 amp. per sq.ft. is used for the grade of anode made in the Philadelphia mint. The product is usually about 99.95 per cent. gold, the greater part of the impurity being silver.

The slimes and the electrolyte contain all the metals which were in the anode, and it is here that most of the platinum and palladium accumulate. The platinum is precipitated by salammoniac from the foul solution as platinum-ammonium chloride, which is carefully washed and upon heating yields spongy platinum. This is a source of income heretofore lost, and only because of the accumulation of traces in the electrolytic process is its recovery possible. Much smaller amounts of the rarer metal palladium are also recovered.

The slimes produced are chiefly a mixture of silver chloride and finely divided gold, and at times a few grains of iridium. After washing, granulated zinc is added to this mixture to reduce the chloride to metallic silver and after washing a second time, the whole is melted into bars to be used after proper alloying in the silver cells as anodes.

*Excerpts from an article in *Elec. World*, June 23, 1910.

Cupro-Nickel Steel

By G. H. Clamer *

In this paper the iron-nickel and iron-copper series of alloys were reviewed at length to show what surprising results are obtained by the joint addition of copper and nickel. Alloys can be produced carrying from 5 to 20 per cent. copper, which without nickel, would be extremely hard, brittle and red short. By the addition of nickel in the proportions of 20 to 50 per cent., these become highly ductile, easily forgeable, and easily machineable. Such alloys can be rolled into sheets or rods and can be machined without difficulty.

The following are tests of two typical alloys within these ranges of proportions:

	No. 1.	No. 2
Copper, per cent.....	9.00	19.50
Nickel, per cent.....	22.00	45.00
Carbon, per cent.....	0.22	0.2
Ultimate strength, lb.....	101,000	98,230
Elastic limit, lb.....	57,300	54,150
Elongation, per cent.....	42.5	35.00
Reduction of area, per cent.	61.5	47.9

These tests were made on rolled rods. The elastic limit is quite low in proportion to the ultimate strength, which naturally accounts for their softness. Alloys at the lower range of the series can be bent cold to an angle of 180 deg. without fracture, whereas those at the higher end of the series cannot be bent so far Alloys at the lower end of the series will resist corrosion in a highly satisfactory manner, and those at the upper end are practically non-rusting. In addition to this, the alloys have a very low coefficient of expansion.

Use of Such Alloy

Just what use such alloys might be put to has not yet been determined, but no doubt quite a number will suggest themselves, such as a substitute for the present 25 to 35 per cent. nickel-steels, and probably quite a number of others, because the steel can be produced at a very much lower cost, not only because of the substitution of copper for nickel, but because the alloy can be made from Monel metal, a commercial alloy of copper and nickel, containing copper and nickel in correct proportions for making such a steel. It is also possible to make the steel directly from Sudbury nickel ores, by simply smelting and bessemerizing to eliminate the iron to the extent desired, roasting the matte produced and finally reducing the combined oxides resulting from roasting the matte. It is thought that either by the use of Monel metal for making the steel alloy or by the direct production of it from the ore, that the cost of production might be sufficiently reduced to make it attractive for many uses where its resistance to corrosion and its low coëfficient of expansion will warrant the cost. Such sheets can be produced to sell at a very much lower price than copper, and probably two to four times the price of commercial copper-coated iron and steel sheets. As the alloy is about twice as strong as the soft steel and three times as strong as copper sheets, thinner gages can be used.

Substituting Copper for Nickel

Noting the curious and unexpected results obtained with these high copper-nickel alloys, Mr. Clamer became curious to know what would be the effect of replacing part of the nickel in nickel-steel within the pearlitic range by copper, and accordingly made such steels with from 1 to 8 per cent. Monel metal, in which the proportion of nickel to copper is roughly 2½ per cent. nickel to 1 per cent. copper. Here again the copper acts like so much nickel, at least when present in these relative proportions, and it is possible, therefore, to produce a steel of practically the same physical properties as nickel-steel, at much reduced cost.

The valuable properties of the nickel-steel, carrying below 6 per cent. nickel, have, of course, long been recognized and recently the importance of copper as a valuable constituent of steel, instead of a metal to be looked upon as a detrimental impurity, has also become recognized. It is probably not quite so surprising, therefore, that the joint addition of copper and nickel within this range of proportions is productive of valuable results. The addition of these two metals in combination seem to have the same effect upon the steel as if they were individually added, the copper in its effect really being about the same as so much added nickel. It is possible, therefore, to replace part of the nickel in nickel-steel by copper, without materially altering the physical properties.

Discussion on the Paper

In discussing the paper, Capt. William R. Hunt said that many years ago, rails made from Cornwall ores contained as high as ½ per cent. copper. Rails made with these ores as a basis contained no phosphorus, high copper and incidentally a little sulphur. Another member stated that these rails, made at Scranton, from Cornwall ores, 15 years ago, containing 0.6 per cent. of copper and 0.4 per cent. carbon, are still giving good service.

J. V. W. Reynders, Pennsylvania Steel Company, explained that the copper was now being taken out of the Cornwall ores, not because the copper is not beneficial, but to recover the price of the copper. He added that he hoped to soon be able to announce the results of a mixture of Cuban iron ore, containing nickel and chromium, with Cornwall ore.

Henry Souther said that notwithstanding the beneficial effects of copper in steel, it is a detriment, especially in tubing that is to be welded. It was added that copper seems to have the same effect on welding as a high percentage of sulphur, and, in fact, steel containing high phosphorus and high sulphur welds better than steel containing copper. Another member said that he had successfully welded steel containing carbon 1 per cent. and copper ½ per cent., and experienced no difficulty. The steel was electrically welded.

Note—Abstract of a paper read before the American Society for Testing Materials, June, 1910.

*Metallurgical engineer, Philadelphia.

Mount Lyell Mining and Railway Company, Ltd.

The Mount Lyell Mining and Railway Company, Ltd., for the half year ended March 31, 1910, reports a net profit for the half-year derived from all sources of £115,335.

Using an average of only three furnaces, the Tasmanian plant treated a total of 200,441 tons of material. The coke consumption was larger than during the previous half-year owing to the increased amount of ore from the North Mount Lyell mine, which is lower in sulphur and much more silicious than the ore from the Mount Lyell.

In the converting department, 9455 tons of matte, assaying 47.85 per cent. Cu, 37.74 oz. silver and 0.856 oz. gold per ton were converted into 4164 tons of blister copper, yielding 9,215,360 lb. of fine copper containing 338,976 oz. silver and 7627 oz. gold.

The cost of producing blister copper per ton of ore was $3.98, which is slightly higher than for the previous half-year, due to the fact that a larger proportion of ore from the Mount Lyell mine was secured from the underground workings and also to the greater percentage of coke used as mentioned above.

Mining, exploration and development were carried on with the usual regularity in the Mount Lyell and North Mount Lyell mines, the total amount of ore broken and sent to the reduction works being 189,950 tons. In exploration and development 3672 ft. of work were done.

The company's chemical and superphosphate works, although somewhat hampered by a coal strike and labor disturbances, maintained its production and output. Good progress has also been made with the erection of the new chemical works at Rocky Bay, Fremantle, Western Australia.

A storage reservoir having a capacity of 25,000,000 gal. was completed and No. 5 blast furnace was rebuilt along the lines found effective in No. 6, that is, increase in hight of smelting column, and introduction of mechanical push-feeding device. A dividend and bonus of 42.5c. per share amounting to £105,000 was paid in December.

Agglomeration of Manganiferous Limonite Ore

Fernic Works in Germany Subject Ore to a Temperature of 1000 Deg. C. in Revolving Cylinder Furnaces. Coal Dust Firing Employed

BY F. WITTE

The ores treated at the Fernic iron works near Giessen, Germany, consist of a friable limonite with granules and nodules of pyrolusite, lumpy mud and a considerable amount of aluminum silicate. The chemical composition of the air-dried ore is as follows: Fe_2O_3, 31.96 (22.37 per cent. Fe); MnO_2, 29.04 and MnO, 2.82; (20.54 per cent. Mn); Al_2O_3, 9.35; SiO_2, 12.97; P, 0.08; H_2O, 8.09 (chemically combined); and CO_2, 0.44 per cent. As the ore contains from 20 to 30 per cent. moisture, steam dried, the metal contents would be: Fe, 16.78 and Mn, 15.41 per cent.

The large percentage of water on which freight had to be paid and the friability of the ores induced the management to eliminate these conditions. The clay content of the ore seemed to be high enough to permit briquetting and baking at the mine. Tests made on a small scale demonstrated that 33 per cent. of water, including the combined water, could be expelled and the ore brought up from 32 to 50 per cent. in metal contents. Experiments on a large scale, however, showed that the briquets did not possess sufficient hardness to stand transportation. The final product was a small quantity of lumps and a great deal of loosely cohering stuff that would turn into dust. Moreover, the operation was too expensive.

The company then tried revolving cylinder furnaces of the type used in cement works. These were manufactured by a firm at Frankfort-on-the-Main. Experiments on a small scale on Fernic ores were made and it was found that at a proper temperature all the water could be expelled and a product obtained in excellent shape for the blast furnace. The ore particles were fritted together, consisting of porous, but firm lumps. The furnace builders thereupon filed an application for a patent on this process.

Successful Furnace Obtained

The first furnace built for the Fernic works was 98 ft. 6 in. in length and 6½ ft. in diameter. After numerous trials satisfactory results were at last obtained and a second furnace measuring 114 ft. 10 in. by 7 ft. 10 in. was erected. The main difficulty experienced with the first furnace was the regulation of the temperature so that agglomeration and not slagging of the ore would take place. A long series of pyrometric measurements carried out in connection with microscopic studies of thin sections from the product, demonstrated that at a temperature of 1000 deg. C. the aluminum silicate would commence to fuse and envelop the limonite ore particles without the latter losing oxygen. At 1100 deg., however, the manganese minerals would be reduced and fused, which is not desirable for the subsequent treatment in the blast furnace. The smelting works would not accept a product so dense and poor in oxygen. After repeated trials in changing the speed of the furnace it was discovered that the ores exposed for a length of 13 ft. only to the highest temperature would furnish the right kind of a product.

Description and Operation of the Furnaces

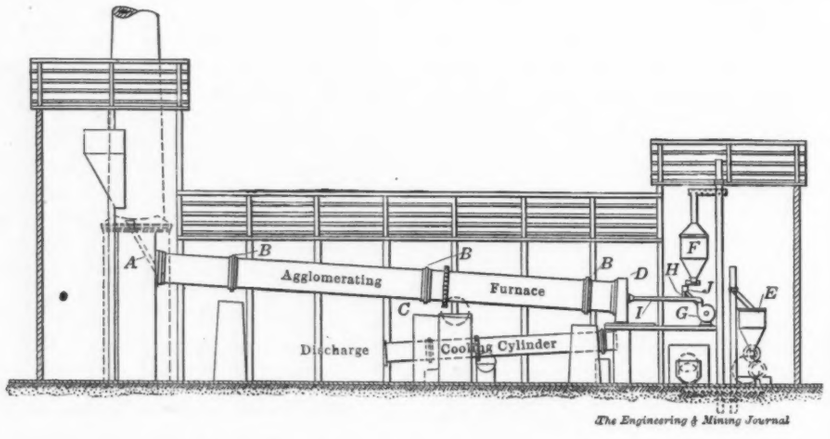
A vertical longitudinal section of a complete agglomerating plant similar to that at the Fernic works is shown in the accompanying sketch. The charge which should be as homogeneous as possible is dropped into the feed pipe *A*. By means of a horizontal damper or gate moved by an eccentric, the raw ore enters the furnace through this pipe and moves in consequence of the revolving motion and inclination of the furnace downward against the hot gases coming from the fire box. The charge loses its water on the way and finally arrives at the hottest zone where the agglomeration takes place.

The furnaces are made of riveted boiler plate lined with firebrick and are inclined at an angle of 6 deg. toward the fireplace. They are provided with three steel rims *B* by which they are supported on two rollers of cast steel and are revolved by a geared rim *C*. A 40-h.p. electric motor supplies the power for both furnaces at a speed of one revolution per minute. At the lower end the furnaces revolve in the iron frame *D* which allows the agglomerated ore to drop down into the cooling cylinder. The upper end of each furnace is closed with the exception of a central opening for the flue and a working door. The lower front wall is made removable in case of repairs.

Preparing and Feeding the Fuel

The long-flaming gas coal used at the Fernic works for making coal dust comes from Westphalia. It is first put into a drying cylinder, 49 ft. 2 in. long by 5 ft. in diameter, of similar construction to that of the furnaces. It is geared to make three revolutions per minute. The cylinder, with open ends, smooth inside and without lining, is enclosed in masonry and heated by means of a grate fire. The dried coal runs into a conveyer, which discharges into the boot of a bucket elevator and thence into a hopper *E* above the grinding mill.

Through conveyers and a bucket elevator, the coal dust is discharged into the hoppers *F*, which feed the furnaces by means of a fan *G*, the tube *I* and the feed for the coal dust at *J*. The fan makes 800 revolutions and produces 3532 cu.ft. of air per minute at 2⅜ to 2¾ in. water pressure. It blows the air charged with coal dust into the tube *I*, which tapers from 14 to 10 in. in diameter. The feeding of the coal dust takes place at



AGGLOMERATING FURNACE AT FERNIC IRON WORKS

NOTE—Abridged translation of an article in *Stahl u. Eisen*, May 4, 1910.

H and may be regulated as follows: From the coal-dust bin *F* three small screw conveyers carry the coal dust into a larger conveyer that discharges into the closed box *J*. From here it passes over a shaking device through the gutter or spout *H* into the tube *I*, where it is carried off by the air current. In the box *J* there is an additional valve through which a further regulation or temporary stoppage of the feed may be effected. The surplus coal dust will then drop through a gutter into an elevator that will bring it back to the bin.

A wood fire is used to start the furnace, and as soon as this is fairly ablaze, coal dust is admitted, which, on ignition, sends off a powerful sheaf of fire. An attendant regulates the feed of the coal dust so that the temperature of the furnace does not rise too high. The use of producer gas in lieu of the coal dust has not given any satisfaction.

Composition of the Agglomerated Product

From the furnace the agglomerated ore drops into the cooling cylinder at a temperature of 1000 deg. C. This cylinder resembles in construction the furnace proper, but is of smaller dimensions and lined only in its upper half. From the lower end the ore is discharged into a storage bin or hopper, ready for loading into railroad cars.

The ore agglomerated at the Fernic works consists, for the most part, of well fritted, porous, firm lumps, of very light pieces of burned clay nodules enveloped in a crust of fused ore particles and a small amount of fine granules of less than pea size. The composition of the product is as follows: Fe_2O_3, 37.59 (26.31 per cent. Fe); MnO_2, 9.91 and MnO, 20.70 (23.30 per cent. Mn); Al_2O_3, 10.31; SiO_2, 15.94; P, 0.09; H_2O, 0.31 (Chem. combined); CO_2, 0.05 per cent. This shows that the ore has undergone a concentration in metals from 32.19 to 49.61 Fe + Mn. According to the analysis, no deoxidation of the Fe_2O_3 has taken place, while the reduction of MnO_2 to MnO has been considerable, but unavoidable. For the production of pig iron low in carbon as required for steel making, this is rather a disadvantage.

Furnace Capacities

The capacity of the agglomerating furnaces at the Fernic works has ranged from 60 to 90 tons per day for the smaller one and from 120 to 180 tons per day for the larger furnace. The discrepancy in the tonnage of each individual furnace is attributed to the formation of an annular crust or accretion in the hottest part of the furnace, which has to be barred out from time to time, an operation that involves a delay of some four or five hours. The formation of these crusts is principally due to irregularity in firing, but the varying physical condition of the raw ore may also contribute to it. The disparity of tonnage between the two furnaces is to be sought in their size, the large furnace being more easily handled than the smaller one. The builders of the plant at the Fernic works, therefore, recommend furnaces 164 ft. long by 9 ft. 10 in. in diameter, and estimate their output at 200 to 250 tons of agglomerate in 24 hours.

Power and Fuel Consumption

The consumption of power at the Fernic plant amounts to 170 h.p., distributed as follows: 40 h.p. for running the furnaces; 30 h.p. for driving two fans, one for each furnace; and 100 h.p. for drying cylinder, grinding mills and conveyers. The coal-dust consumption amounts to from 12 to 15 per cent. of the agglomerate produced.

The 164-ft. furnace is believed to require only 10 per cent. fuel, which will be a large saving. It is further estimated that such a furnace, with all its auxiliary machinery, will cost $50,000 and supply 60,000 tons of agglomerate per annum, with a power consumption of 140 h.p., using four men per shift.

Steam and Air Flow Meters

The necessity for economy induced the General Electric Company to conduct experiments with a view to perfecting a practical steam meter. Over 1000 actual tests were made and such an instrument is now on the market. The company developed a recording steam-flow meter, two types of indicating steam-flow meters and an indicating air-flow meter, each of which is designed to measure accurately the rate of flow of steam, air or other gases under any conditions of pressure and temperature in general practice.

Principle of the Flow Meter

The principle governing the action of the flow meter is a modification of that of the Pitot tube. A brass nozzle plug, screwed into the pipe at the point where the flow is to be measured, carries two sets of openings: A leading set, facing the direction of flow and extending diametrically across the pipe; and a trailing set, consisting of two openings at 90 deg. and one at 180 deg. to the direction of flow. The impingement of the steam against the leading openings, sets up in them a pressure equal to the static pressure plus the pressure due to the velocity head, while the trailing set is acted on by the static pressure less that due to the velocity. The difference in these values is a measure of the velocity, and for constant temperature and pressure, gives the rate of flow. The pressures existing in the two sets of openings are communicated through separate longitudinal tubes to the outer end of the plug and from there by ¼-in. iron pipes to the meter.

Recording Steam

The recording steam-flow meter, type R, form D, is a curved drawing instrument, accurately calibrated to record the total rate of steam flow in pounds per hour. In this meter there are two cylindrical hollow cups filled to about half their hight with mercury and joined together at the bottom by a hollow tube. This U-tube is supported on, and free to move as a balance about, a set of knife-edges. The two pressures obtained by the nozzle plug are communicated to the cups by flexible steel tubing, whereupon the difference in pressure is equalized by a rising of mercury in the left-hand cup and a falling in the right-hand cup. Due to the displacement of the mercury, the beam carrying the cups tilts on the knife-edges until the moment of the counterweights on the extreme right of the meter exactly balances the moment caused by the displacement of the mercury in the left-hand cup.

The motion of the beam is multiplied by levers and is registered by a pen. The time element of the meter consists of an eight-day clock driving a drum and feeding paper at the rate of 1 in. per hour. Charts are supplied in sizes to measure a flow of from 2000 to 240,000 lb. per hour, and of sufficient length to last one month. The rate of flow can be read at any instant or the average rate of flow calculated for a given time.

Indicating Steam Flow Meters

The type I, form F, steam-flow meter will meet general requirements where an indicating rather than a recording instrument is required. Owing to its simplicity of construction, light weight and durability, it will be found especially useful for testing work.

Air Flow Meter

The type I, form F, indicating air-flow meter is identical in principle and method of operation with the steam meter, except that water is used in the "U" tube as a working fluid and the chart dial is calibrated to read in cubic feet free air per minute at 70 deg. F. per square inch pipe area. The air flow meter is made in two ranges: Low pressure 12 to 35 lb., and high presure 10- to 120-lb. gage.

Uses

Some of the many uses for which the meters are adapted can be summarized as follows: For recording the total amount of steam generated by a battery of boilers; equalizing the load on individual boilers; discovering internal leaks in boilers; determining the deterioration of efficiency of a boiler due to formation of scale; the efficiency of stoking; the amount of steam sold for power, heating or manufacturing purposes; for discovering losses originating from leaks between boilers and points of consumption, which could not be otherwise detected.

The Calumet & Hecla Sand Wheels

BY C. L. C. FICHTEL *

The determining features in the selection of a site for a stamp mill in the Lake Superior copper district are: An abundant water supply; ample space for the disposal of tailings; a site within reasonable distance from the mine, and accessible for economical transportation. The stamp mills in this section with one or two exceptions, are built on the shores of lakes, from which the water is pumped for milling purposes and into which the tailings are discharged. The average amount of water used throughout the district in this work is about 22:1 by weight. It is readily seen that a large quantity of water is necessary for the tremendous rock tonnage that is handled.

Disposal of Tailings

The tailings are in the form of fine gravel and in order to carry it in suspension the launders must mave a minimum drop of ⅜ in. per foot. Therefore, if the tailings are to be carried any great distance, the mill must be built at a considerable elevation above the dumping space to allow it to be handled by gravity, or the introduction of mechanical means to secure sufficient hight becomes necessary.

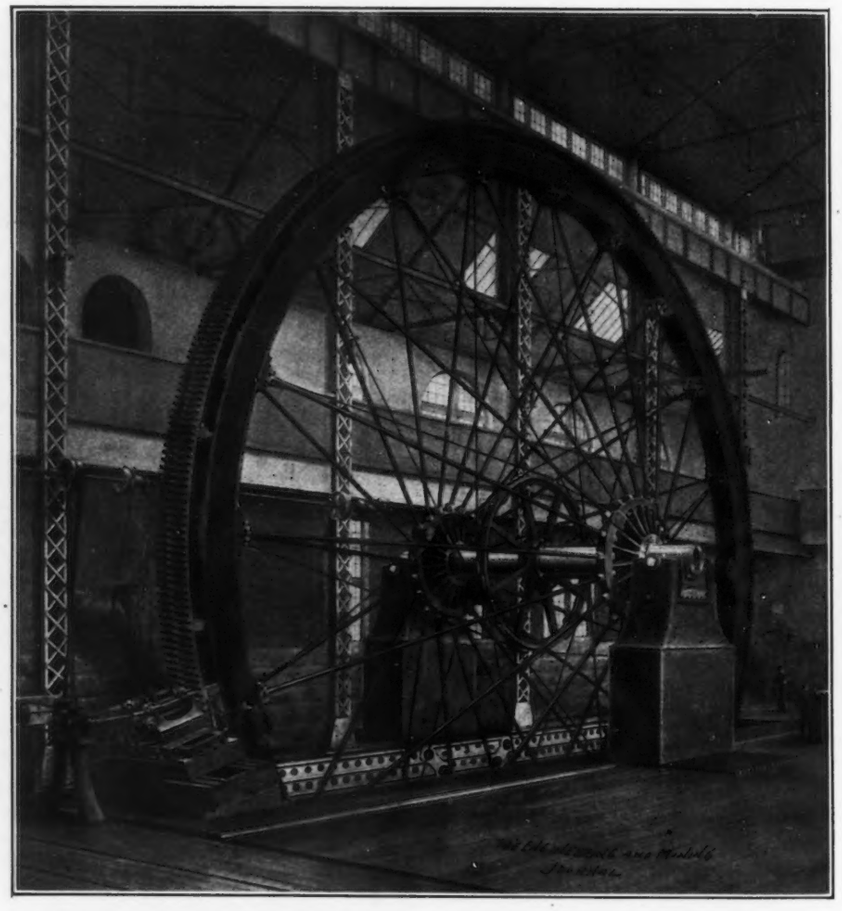
The Calumet & Hecla mills are situated on the flat, but a few feet above lake level, in close proximity to the original shore line of Torch lake. The available space for the disposal of the tailings became filled and in the further extension of the launders it became necessary to secure an additional initial hight to allow for drop. This point was accomplished by the use of large wheels, known as sand wheels, which elevated the sand and water to the required hight. The company has five of these wheels in operation, one of which is 40 ft. in diameter, three, 50 ft., and one, 60 feet.

The tailings at the Calumet & Hecla mills are among the most extensive in the world and carry from 5 to 15 lb. of copper to the ton. Many attempts have been made to rework these sands, with varying success. The company a few months ago started a large regrinding and concentrating plant which is now treating the tailings as they come from the stamp mills and it is planned ultimately to work over the old sands.

The 60-foot Sand Wheel

In appearance this wheel resembles a gigantic bicycle wheel and was designed along those lines by E. D. Leavitt, of Cambridge, Mass., formerly consulting engineer for the company. This wheel was built by the Poole Engineering and Machine Company, being one of the few companies having shop facilities capable of handling a piece of apparatus of this size. It is 60 ft. in diameter and weighs with its base plates and supporting columns nearly 500 tons. The shaft of the wheel is made of Krupp's crucible cast steel, 32 in. in diameter, 27 ft. long, with a 16-in. hole bored through the center and weighs about 21 tons. On either end of the shaft is fitted a gun-metal hub, each weighing 10 tons. Forty 4-in. spokes radiate from each of these hubs, terminating in a block which supports the sections of the inner rim. At the center of the shaft is placed a wheel about twice the diameter of the hubs and from this radial, bars or spokes extend to the center of each block. All these spokes are fitted with a special nut and thread for adjusting purposes.

The wheel consists of two concentric rings, made up of 20 segments each. The inner rim is supported by the radial spokes and strengthens the entire structure. The outer rim is fastened to the inner by bolts and keys, and on the periphery of this rim staggered or step-gear teeth are cast, which are milled to an accuracy of 0.001 in. variation. The pitch of the working teeth is 4.7 in. and each row of teeth is 12 in. wide, making a working face of 24 in. There are 26 of these teeth on each segment, or a total of 520 teeth for the wheel.



Calumet & Hecla Tailings Wheel in Course of Construction; Milling of the Teeth

On each side of this sectional rim, which is shown in the cut taken when the teeth on the outer rim were being milled, an extension of the same depth as the rim and about 5 ft. wide is riveted. Into each of these rectangular iron plate boxes are fitted 275 iron buckets, each 3 ft. wide by 4 ft. 6 in. long. When they are all in place these parts of the wheel resemble the blades of a huge turbine.

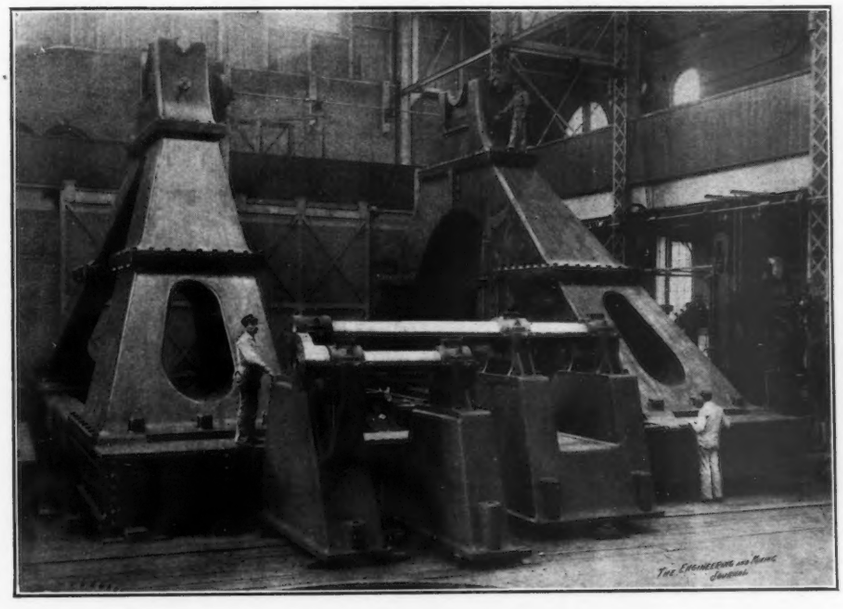
*Calumet & Hecla Mining Company, Calumet, Mich.

Operation of the Wheel

In revolving the wheel passes through a shallow pit into which the tailings from the mills empty, thus filling the buckets in turn on their way through. The buckets are set at an angle, which, together with the peripheral velocity, prevents discharge until a horizontal position is reached near the top at an elevation of about 50 ft. An iron trough is built on each side of the wheel, into which the buckets empty and through which the water and gravel are carried to the launders.

Power Supplied by Motor Through Rope Drive and Pinion

The wheel is driven by a 700-h.p., 3-phase, 25-cycle, 440-volt induction motor of the wound-rotor, external-resistance type, by means of a rope drive and pinion. The pinion is 37 in. in diameter and is fitted with two rows of teeth accurately milled to match the large wheel, each row having 23 teeth. The motor operates at 150 r.p.m. and the sand wheel makes about four revolutions per minute, giving the peripheral speed at the inner edge of the buckets about 12 ft. per second.



Supporting Columns for Calumet & Hecla Tailings Wheel

Iron Ore Deposits of Vancouver and Texada

The iron-ore deposits of Vancouver and Texada islands, B. C., interest in which has been stimulated by efforts to reëstablish the iron industry formerly carried on at Irondale, Wash., have been made the subject of a report[1] by the Canadian Department of Mines. The Texada ores for a number of years found a market at the Irondale plant. Magnetite is the most common iron ore of British Columbia and numerous outcrops are found both on the east and west sides of Vancouver island. The coast magnetites are higher in iron, some masses containing 70 per cent. iron, though the ore, as a whole, will probably not average over 55 to 60 per cent. The phosphorus content is low. The sulphur content is high and local abundance of sulphides is common. A thorough roasting of the ore might, therefore, be necessary.

There are numerous claims on Vancouver island where the few available workings show the ore to occur in stringers, blankets and pockets. There are, however, a few properties, surface indications on which are so promising that they must sooner or later be explored and developed. Among these are the iron mines on Texada island, and the properties at Head bay, Klaanch, Quinsain and Gordon rivers on Vancouver island. A detailed description of these is given, together with analyses of the ore.

The deposits on the western slope of Texada island, from three to four miles north of Gillies bay, have been known for many years, and were taken up for iron as early as 1875. The principal deposits are on the Prescott, Paxton and Lake properties. The Prescott has been most largely developed and for several years shipped ore to Irondale, Washington. They are situated close to the water front, and a little bay offers good facilities for shipping. Mr. Lindeman also treats briefly of the possibilities of an iron industry in British Columbia, giving data as to the cost of manufacturing pig iron, which is calculated as approximately $16 per ton, as compared with the cost of the imported article ranging from $22 to $31. He is not disposed to be hopeful as to the success of such an undertaking, owing to the limited home market. He anticipates that the prospective rapid development of the province will bring more favorable conditions and make it profitable to utilize its iron-ore resources.

[1] "Iron Ore Deposits of Vancouver and Texada Islands, B. C.," by Einar Lindeman. Canadian Department of Mines. Ottawa, Government Printing Bureau, 1910.

The Ooregum Gold Mine, India

Special Correspondence

During 1909 125,349 long tons were crushed by the Ooregum Gold Mining Company, of India, Ltd., and a yield of £349,012 was recovered. The grade of the ore (which has steadily risen since 1905 when it was 8 dwt. 21 grains of gold per ton) averaged 12 dwt. 15 grains of bar gold per ton as against 12 dwt. 3 grains in 1908. The amount realized was 55.6s. ($13.52) per ton milled.

The ore reserves are slightly above what they were last year and are now 157,582 tons; a figure none too large, taking into consideration the annual production of about 125,000 tons. The camp appears to be overrun with rats and mice as the slaughter of 17,508 head during the year is recorded, as well as 263 dogs on account of rabies.

The mine is now being operated on more favorable conditions than formerly, owing to the direct communication between the deeper levels and the surface through Bullen's vertical shaft. Costs will also be favorably affected through the change of rate for power supplied from the Cauvery electric station, the cost per h.p. having been reduced from £24 to £10. The depth of Bullen's shaft is now 3450 feet.

Tharsis Sulphur and Copper Company

The Tharsis Sulphur and Copper Company, Spain, produced 4357 tons of refined copper in 1909, a decrease of 70 tons from the output in 1908. The Tharsis mines extracted 79,432 tons of ore and the Calañas mines 293,643 tons, a total of 373,075 tons, as compared with 440,886 tons in 1908. The Calañas mine also produced 15,977 tons of "cupreous sterile." On the Tharsis there were removed 12,177 cu.m. of overburden, and on the Calañas 226,859 cu.m. Washing of the old mineral heaps at the Lagunazo mines was continued during the year. The net profit for the year was £162,743 and a dividend of 5s. per share (12½ per cent.) was declared. The report shows that in the 43 years of the company's operations gross profits to the amount of £13,012,200 have been made, of which £9,164,682 (830⅔ per cent. on the stock) has been distributed as dividends.

The Tilden Automatic Stoker Controller

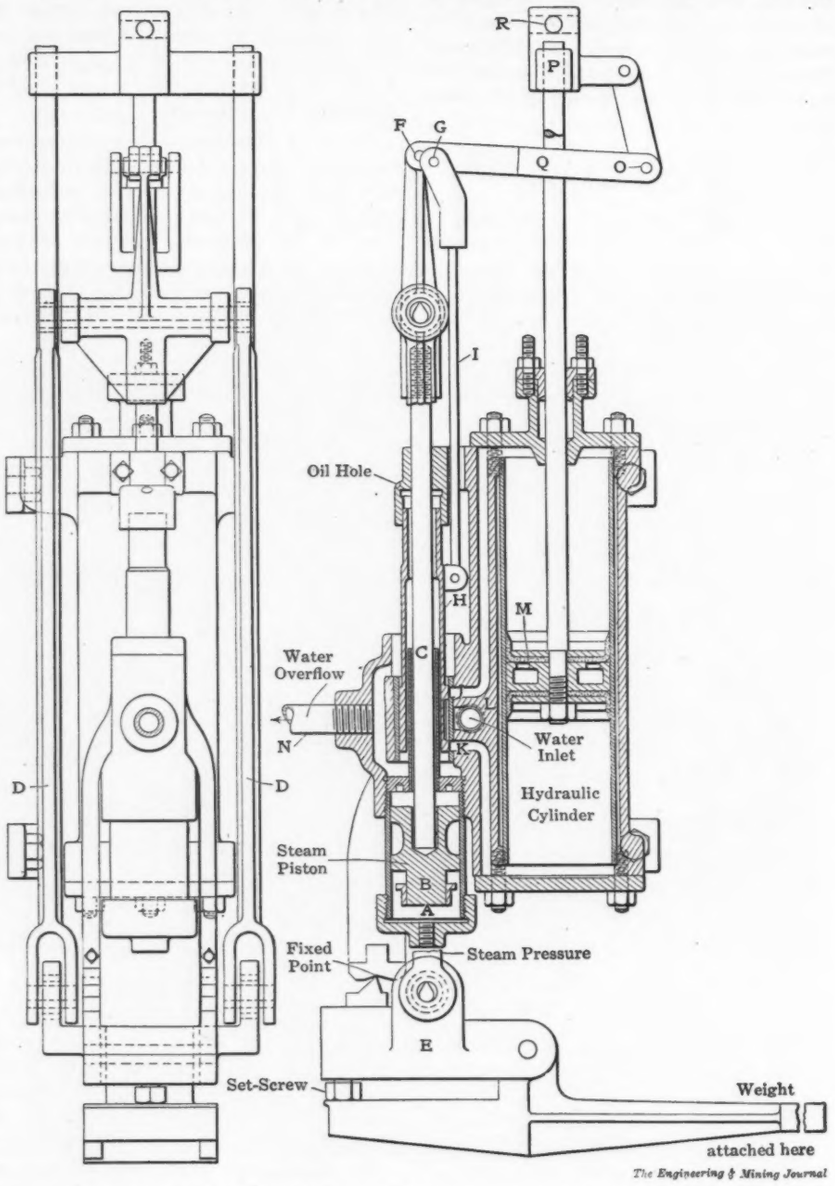
The Federal Lead Company of Flat River, Missouri, recently installed a Tilden automatic-stoker controller, which it is claimed, will reduce the amount of coal consumed, and at the same time give more uniform results in the operation of the boilers.

The automatic-stoker controller regulates the position of the boiler or flue damper and the operating speed of the stoker. It consists of a brass-lined water cylinder having a leather-packed piston *M*, which is connected to a water supply through a pilot valve *H*. This pilot valve is actuated from the steam piston *B* by a system of levers, whereby a movement of the steam piston in either direction causes the pilot valve to admit water under pressure to either side of the main piston through the ports *J* and *K*. The outward motion of the main piston tends to close the pilot valve, and when the steam piston reaches a point where its increasing load balances the boiler pressure, the main piston having overtaken it, the pilot valve is closed, thus locking the main piston in positon.

Operation When Pressure Decreases

In a corresponding maner as the steam pressure decreases the steam piston moves inward and first opens the pilot valve in the opposite direction allowing the escape of water from the main piston and admitting water to the other side, thus reversing the motion and allowing the main piston to move back until it again overtakes the steam piston, closes the pilot valve, and locks itself as before. It will thus be seen that the movement of the main piston corresponds exactly to the fluctuations of the steam pressure. The steam piston is counterweighted in such a manner that a variation of 5 to 10 per cent. of the normal steam pressure will cause a maximum travel of the steam piston and correspondingly of the main piston. The total travel harmonizes exactly with the gradual increase or decrease of the steam pressure so that when the mechanism is in operation it is in a state of balance moving very slightly one way or the other corresponding to the fluctuation in the steam and thus maintaining just enough draft and fuel feed to produce the required steam pressure. All levers are hung on knife edges, the pilot valve is balanced so internal friction is reduced to a minimum. The machine moves upon a variation in steam pressure of less than can be detected on the ordinary steam gage.

The action thus obtained occurs with slight increase of steam pressure and the reverse action is obtained with a corresponding decrease of pressure. The resultant position of the damper is due to a series of slight motions in opposite directions, as above outlined, which follow the fluctuations of the steam pressure, the entire apparatus being in a fixed state of equilibrium, except at such times as increase or decrease of steam pressure serves to throw it momentarily out of balance. The main piston is connected at *P*, with a set of rods or levers to the damper or stoker, which are to be regulated.



THE TILDEN AUTOMATIC STOKER CONTROLLER IN USE BY THE FEDERAL LEAD COMPANY, FLAT RIVER, MO.

Advantages of Tilden Stoker

The advantages gained by the use of the Tilden stoker controller are:

(1) The stoker controller governs the capacity developed by the furnace, generating just as many horsepower as are required to meet the demand.

(2) For each desired capacity it supplies a certain definite rate of fuel feed and air supply.

(3) The air supply at all rates bears a fixed relation to the fuel supply.

(4) The controller provides uniform steam pressure, without extreme peaks and depressions of the "saw tooth" effect common to close hand-damper regulation.

(5) The controller does not impose that severe furnace condition of closing the damper tight with the furnace very hot, thus causing a rapid deterioration of furnace walls and grates.

(6) The regulator responds to the slightest demand for steam, a drop in pressure of five pounds causing it to change the furnace and boiler from its state of minimum rating to one of maximum rating.

(7) The controller will operate between any ordinary limits of steam pressure, and the water pressure necessary to operate is any pressure above 20 pounds.

The Porcupine District, Ontario

BY R. W. BROCK*

Great interest is being taken in the Porcupine district. Already prices of claims are away above any determined value, and the buying and selling is on a speculative rather than a business basis. About 9000 claims have been staked. The great majority, of course, have no real present or prospective value as mines, but they are in Porcupine and they can be bought and sold. But there are some really good-looking prospects, quartz is remarkably widespread over the district, and visible gold is abundant in some showings, and has been found at numerous and widely separated points.

Most of the gold occurrences so far located are in the township of Tisdale, but some of the properties are in Whitney, others in Shaw and in the Forest Reserve. A new discovery has just been announced from Kamiskotia lake, west of the Matagami river. Then, of course, there are the older discoveries in Nighthawk lake. The prevailing rocks are greenstones (including old diabases), quartz-porphyries, and schist, presumably of Keewatin age, with some slates, greywackes, and conglomerates, probably Huronian. The quartz seems to occur in any of the rocks and in all manner of forms. There are some well defined veins, there are some large apparently isolated masses of it, the so-called "domes" and there are numerous irregular quartz stringers, which may swell out in places to large masses that may or may not have a vertical extension. The majority of the veins and zones of quartz stringers seen, had a strike approximately northeast, while that of the rocks was more nearly east—that is, they were distinctly cutting across the strike or schistosity of the rocks, as the case might be. A few had a strike of a little south of east. The quartz holds many inclusions of more or less altered country rock. Pyrite is rather extensively developed in and along these inclusions. The gold, which is often coarse, is distributed in much the same way as the pyrite, with which it is usually rather closely associated, but some may be found in the pure quartz. A little galena, blende, and chalcopyrite may also be present. A ferruginous carbonate, probably ankerite or siderite is, next to quartz, the most abundant gangue mineral. It weathers deeply to reddish-yellow iron oxide. Calcite, chlorite, talc, probably sericite, and feldspar were also noticed.

The geology of the district is being studied by Professor Miller, provincial geologist, and his assistants, Messrs. Knight and Burrows, who will shortly issue a full report and map. It was under their guidance and through the information kindly furnished by them that in the short time at my disposal I was able to get a comprehensive view of the camp and some knowledge of the geological conditions.

Porcupine is fortunate in having had a number of strong interests take hold in the initial stages of the camp, which insures intelligent development and a thorough test of some of the more promising prospects. Plants were brought in during the winter, and a surprising number of properties are equipped with power plants.

The show properties at present are the Timmons, Dome and Foster.

The Timmons is about 7 miles west of Porcupine lake and 1½ miles east of the Matagami river. A clearing of 40 acres has been made and substantial mine buildings erected. The plant consists of two boilers, a compressor, hoist and dynamo; a crusher and small prospecting stamp mill are being erected. The buildings are lighted with electricity, and supplied with hot and cold water, baths, etc. A number of veins are exposed. On the largest, with a maximum width of about 20 ft., three shafts have been sunk, the distance between the first and last being about 800 ft. For the greater part of this distance, vein is exposed. The deepest shaft is about 90 ft. and is in a 12-ft. vein at the bottom. Sinking is being continued. Beautiful ore, carrying free gold, is obtained at the bottom of the shaft, and over the surface showings, gold splashes are liberally scattered. About 300 tons of very promising ore is on the dump, from which almost anywhere showy specimens might be obtained. Several lots of ore from the dump, sent out for sampling, are said to have yielded high results. The fresh ore is very promising looking and seems quite as good at 90 ft. as on the surface. A number of other veins have been stripped, one of which has been traced about 300 ft. and shows gold at various points.

The Dome is also under vigorous development. Here two large masses of quartz, 60 ft. or so in width and of considerable length, are opened up. Coarse gold adorns the surface of the quartz at a number of points and the systematic sampling of the quartz is said to yield very satisfactory results. Several shafts have been sunk and diamond drilling is now to be undertaken to determine the conditions at depth. A small test mill is being erected and the property is equipped with a good plant and buildings.

The Foster vein is a belt or vein of the iron carbonate filled with transverse masses and veins of quartz. The quartz contains many inclusions of the carbonate in which sulphides and gold have been deposited. This vein or belt has been traced for nearly half a mile and has a width, where exposed on the Foster, of from 6 to 20 ft. Fine showings of gold occur and the clean-cut character and extensive horizontal dimensions of the lode suggest that it may have an equally strong vertical extension.

From the above it will be seen that there are some grounds for the hopefulness regarding the future of this baby camp. Of course there are properties here which will furnish specimens, but never anything more, and lots that will not do even this. There are some that will be "teasers," with just enough quartz with values to attract money for their development; but not enough in one place, or not enough continuity to the bodies to be exploited profitably. But there are some really promising prospects, which, even if they should not prove altogether satisfactory with depth, yet may on their present showings have quite a tidy output of gold.

The development during the next few months, which will furnish some clue as to the deeper conditions, will be followed with much interest. The history of gold mining in Ontario has not been highly encouraging, but it is to be remembered that gold mining in Ontario is today in exactly the same position as was silver mining seven years ago, and the chances of finding a notable gold camp are today quite as good as were the chances of locating a Cobalt at that time.

Porcupine is as yet in the prospect stage. But it has some of the essential qualities of a gold camp, sufficient to have induced experienced mining men to take up options at high figures, and to undertake large expenditures to determine if it possesses all the essential factors.

Access to the district for travelers is now comparatively easy. Most go in via Kelso, at Mile Post 222 on the Temiskaming & Northern Ontario railway. From the railway a stage line runs 12 miles to the inlet of Frederickhouse lake. From here gasolene launches run 14 miles up the river to Nighthawk lake, across the end of the latter and for some miles up the Porcupine river to Hill's. From this point it is 8 miles by trail to Porcupine, including 2 miles that may be covered by canoe ferry. The trip from

NOTE—Abstract of preliminary report issued by the Geological Survey of Canada.

*Director, Geological Survey, Ottawa, Can.

Kelso to Porcupine takes 8 or 9 hours. From Hill's there is also a canoe route up the river with a gasolene service, but the distance is 28 miles. A service is also being established for freight and passengers from the Canadian Pacific railway, at Bisco, down the Matagami river to a point near Timmons mine. This trip is stated to be made in two days.

New Kleinfontein as a Representative Rand Mine

LONDON CORRESPONDENCE

Though the New Kleinfontein mine in the Transvaal has often been referred to on account of its surface equipment, it has rarely been put forward as representative of the Rand in the matters of its reefs and of its position underground. This arises from its situation in the eastern portion of the field, which has generally been looked upon as providing less regularity in the value of the orebody than the more central portions. A résumé of the results obtained during last year and a comparison of these with the figures of the years immediately preceding, show that the orebody in this mine has all that constancy of value which characterizes the banket beds of the Transvaal.

During the year 1909 the gross revenue was £660,856, or 29s. per ton, of which £227,000, or 10s. per ton, were distributed as profit, this being at the rate of 25 per cent. In comparison with this, the figures for the two previous years were: for 1907, 9s. 4d. per ton, equal to 20 per cent.; for 1908, 8s. 1d. per ton, or 20 per cent.

Ore Reserves Only 20 Per Cent. of Share Valuation

The ore reserves at the end of the year amounted to 1,138,599 tons of 7.50 dwt., from which gold to the value of 29s. per ton should be extracted and 10s. should be distributed as profits. Such a distribution would in total be £570,000, equal to about 12s. per share, extending over the period of time taken to mine and treat such an amount. The market value of these shares now is about 50s., of which, therefore, only about 20 per cent. is secured by the profit in sight, leaving 80 per cent. dependent upon the future.

Twenty per cent. may be said to be about the average security provided by the ore reserves of Rand mines, which have long years of life before them, insofar as it can be calculated by the area of the ground. That shareholders are satisfied with this security in a mine, is a great tribute to the remarkable maintenance of a uniform value in the orebody.

Comparison of Ore Reserves with Ivanhoe and Wáihi

With ordinary reefs a much greater security is required, as in the case of the Ivanhoe mine in Western Australia, where the present value of the cash assets and of the profit in sight, is appromixately 70 per cent. of the market value of the shares. In the case of the Waihi, however, the security worked on the same lines amounts to 35 per cent., thereby expressing a confidence which may be referred to the number of large reefs in this mine and to the comparatively shallow depth to which mining has proceeded.

Uniformity of Orebodies

The great uniformity of the orebody in the mines upon the Rand, allows these calculations of present value to proceed beyond the profit of the ore in sight and to include all the ore probable within the vertical boundaries of the reef claims. Nor are such calculations made in secret; we have in the case of the New Kleinfontein mine a very pertinent instance which occurred when, at the purchase of some aditional claims last year, the following circular was issued by its London committee:

"Property — The Orient Syndicate claims, shop and equipment, which have been acquired in exchange for 70,000 fully paid New Kleinfontein shares, consists of 49 nominal claims (equal to 47.037 actual claims) and two water rights. The claims are bounded on three sides by producing and dividend-paying mines, and on the remaining side by a developed mine. It is proposed to augment the present crushing capacity of the reduction works at the New Kleinfontein company by 10,000 tons per month to deal with the ore from the Orient claims. This increase in plant is estimated to be sufficient to exhaust the Orient claims at the same rate as the present equipment will exhaust your present claim area. The capital expenditure estimated for the carrying out at these works and for certain extensions and improvements in connection with the present mine equipment amounts to £100,000.

Estimated Ore Contents of Orient Claims

"It is estimated that there are 2,140,000 tons of milling ore in the property. This estimate is based on the expectation that the main reef series will give results equal to the average results of the New Kleinfontein, Van Ryn and Modderfontein properties, and that the south reef wil be found profitable in 20 out of the 47 claims. Assuming that the above tonnage will yield a profit of 12s. 3d. per ton, which is a fair average of the profits derived from the three bordering mines, and that the claims will be worked out in 18 years from Jan,, 1911; the present value of the claims is estimated to be £10,600 per claim. This figure agrees closely with the average market value of the claims and equipment, of the surrounding mines.

"Purchase Price of Claims—At the date of purchase of these claims the market price of a New Kleinfontein company share was 50s. The price paid for the claims was therefore equivalent to £175,000 and the price per claim equals £3720. From the foregoing it will be seen that the acquisition of these claims on the terms in question is undoubtedly an excellent transaction and should considerably enhance your company's prospects. In addition, however, they possess a secondary value in respect to the facilities which they afford for the working of your western claims, and the manner in which they square off the existing holding, and finally, from a speculative aspect the ground in question adjoins the richer section of your property, and is on the dip of the Van Ryn company."

Little exception can be taken to the figures which form the basis of the statement above, but the presentation of these figures might perhaps have been more open.

Present Value of Claims

The present value of the claims is calculated at a profit of 12s. 3d. per ton, though it is more than likely that this figure is an average working profit, from which in general the distributed profit would be 10s. per ton, and as the present value can only be derived from the profit distributed, the figure of £10,600 per claim became reduced to £8650. From this figure also, not only has the purchase price to be deducted before any profit can be shown in the transaction, but so also has the capital expenditure rendered necessary. This was stated to be £100,000, equivalent to £2130 per claim, so that the complete transaction becomes as follows: Estimated present value per claim, £8650; purchase price per claim, £3720; capital expenditure per claim, £2130; estimated present profit on the transaction, £2800 per claim.

American Women in the Mountains of Peru

Since important Peruvian mines passed under the control of American interests a number of engineers from the United States have gone to that country. This is particularly the case with the great Cerro de Pasco mines on the borders of Peru and Bolivia, which are situated at a high altitude. There has been a sort of general impression that American women cannot live at the Cerro de Pasco, at any rate in comfort and health; and to disabuse the minds of our readers and especially the friends of those engineers who have gone there of this idea, a correspondent sends us a photograph which we reproduce on this page. It does not include all the American women there at the present time, but there are enough of them to show that not only ladies, but children and babies can live there and present a very healthy and prosperous appearance.

The photograph certainly does show a group of women and children whose generally robust and cheerful appearance it would be hard to match in not a few mining camps in the United States. Anyone who is considering or may consider in the future the question of going to Peru apparently need not be deterred by any supposed danger from climate, or difficulty in establishing his family life in that country.

AMERICAN WOMEN AT THE CERRO DE PASCO IN PERU

Buffalo Mines, Ltd.

The Buffalo Mines, Ltd., of Cobalt, in August, 1909, put into commission a cyanide plant which treated from 30 to 40 tons per day of dry slime from the concentrating department. The annual report of the company for the year ended April 30, 1910, states that the process of treatment has been improved and that the plant is gradually working itself into a profitable department. The mining facilities were also increased from 90 to 130 tons and the company is now making preparations to raise this to 160 tons per day. The recently installed electric power is giving satisfaction and the company is now receiving air for mining purposes from the Cobalt Hydraulic Power Company.

Development during the year consisted of 91 ft. of sinking, 31 ft. of raising, 1481 ft. of drifting and the stoping of 43,956 cu.ft., making a total tonnage of ore broken of 39,679.

The mill treated 33,708 tons of ore averaging 40 oz. silver per ton and recovered a total of 1,059,900 oz. equal to an extraction of 78.60 per cent. The concentrates averaged 1575 oz. per ton and in addition the cyanide plant treated 6424 tons of dry slime from the concentrator and recovered 54,872 oz. equal to an extraction of 66.08 per cent. The further saving thus effected brought the total extraction by mill and cyanide plant to 82.67 per cent.

The shipments during the year amounted to 769½ tons of ore and concentrates, of which 115½ tons were high-grade ore. The smeltery returns showed an average of 1570 oz. per ton in the concentrates and 3126 oz. per ton for the ore. There was also shipped 4285 lb. silver bullion returning 54,479 oz. of fine silver. The total production for the year, counting what was on hand April 30, 1910, amounted to 1,491,750 oz. silver at a cost of approximately 26c. per oz. During the year the company paid $320,000 in dividends.

Tasmanian Dividends

The dividends paid by mining companies in Tasmania during the first quarter of 1910 are reported by the Secretary for Mines as follows: Mount Bischoff Tin Mining Company, £9000; Shepherd and Murphy Syndicate, £1000; Brisers Tin and General Mining Company, £15,000, and the Cornwall Coal Company, £1359. Copper and silver mines paid no dividends.

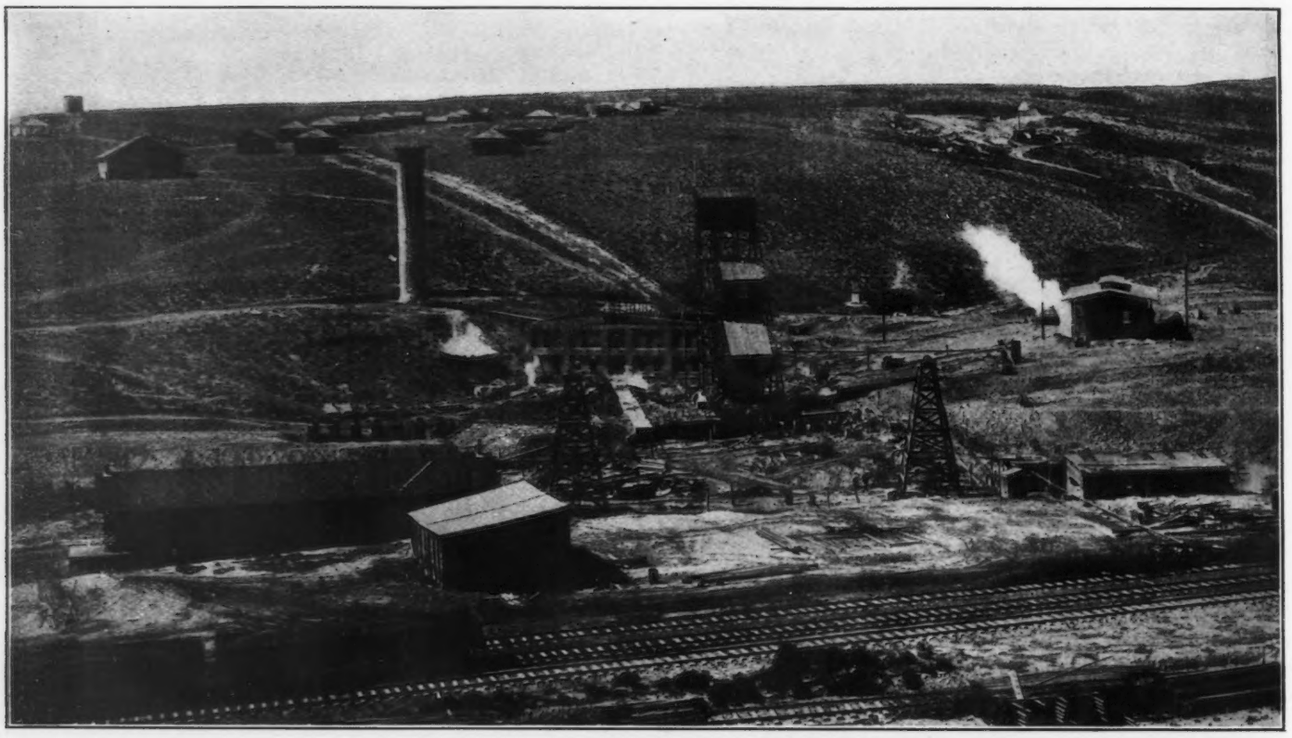
A Model Coal Mining Plant in Wyoming

Description of Equipment and Methods of Superior Coal Company. A Central Power Plant Supplies Five Mines. Electric Hoists Used

BY HENRY M. PAYNE*

The town of Superior lies about 290 miles west of Cheyenne, Wyoming, and is the northern terminus of the branch of the Union Pacific railroad with extends northward from the main line at Thayer Junction. This coalfield was first opened up at Rock Springs, when the Union Pacific was extended through this territory, in the late sixties, and the seams still carry the nomenclature adopted at that time. The coal deposit is horseshoe shaped with one wing at Rock Springs, thence curving northward through Gunn, to Superior at the other wing. At Superior there are four workable seams, the lowest of which is the Vandyke, 6 ft. in thickness, then the No. 7 which is 6 to 7 ft. thick. Next higher is the No. 1 which runs from 7 ft. 6 in. to 9 ft. thick, and the No. 3 showing 5 to 6 ft. These all average an interval of 200 ft., and only the No. 7 and No. 1 are now operated. None of these coals is used for coking but is mined principally for railroad and domestic purposes.

The Superior Coal Company has five mines in operation, named *A, B, C, D* and *E*, in the order of their development. A central power plant supplies the whole operation. This is equipped with eight internal furnace boilers, each 9 ft. 6 in. in diameter and rated at 300 h.p. each. These boilers are fitted with automatic screw-feed stokers, and are placed in a concrete boiler house, in two rows, facing one another, and between them, are elevated concrete bins to which the coal is carried by automatic conveyers, from the re-screening bins at *E* mine. The conveyers are so arranged that they may be fed either from the slack bin, or a loaded car.



VIEW OF POWER PLANT AND "E" TIPPLE, AT SUPERIOR, WYOMING

CONCRETE STACK AT POWER HOUSE

The stack at this central power house is of concrete, with hollow wall, and is located on the hill above the boiler house. The top of the stack is 100 ft. above the grates. Investigation at the time of construction showed that the cost of this stack was exactly the same as would have been that of separate steel stacks for the same horsepower and draft. The inside diameter is 8 ft. The foundation extends upward for 20 ft. from bed rock, and the inside wall, starting at this breeching, is 6 in., 4½ in. and 3 in. in thickness, while the outside wall is 6 in. and then 4 in. thick.

The electric power plant is about 200 ft. up the hill from the boiler house and a 10-in. header extends from the top of the boilers through a steam tunnel, with sufficient grade to drain the water back to the boilers. The electric equipment consists of four General Electric Curtiss turbines for 3000 volts A. C. and two similar turbines for D. C., one 40-h.p. marine engine exciter and one 15-h.p. turbine exciter, with A.C. and D. C. panels. This requires 165 lb. of steam at the boiler house. The A. C. voltage carried is 2300, and the D. C. for use inside, is 250. A portion of the stages are left out of the turbines so that they work non-condensing, as condensers are not economical at this altitude, which is about 7000 feet.

Close to the power plant is a shaft 108 ft. deep to the surface of the coal, over which is a steel headframe with automatic D. C. hoist on top of the headframe, directly over the shaft. This hoist develops 200 h.p. and has a double drum 9 in. wide and 7 ft. in diameter, being operated by the engineer simply throwing a switch, which hoists the cage and automatically dumps it onto the lump screen. The coal passing through the screen either goes into a car or onto a conveyer which carries it up to a re-screener. The

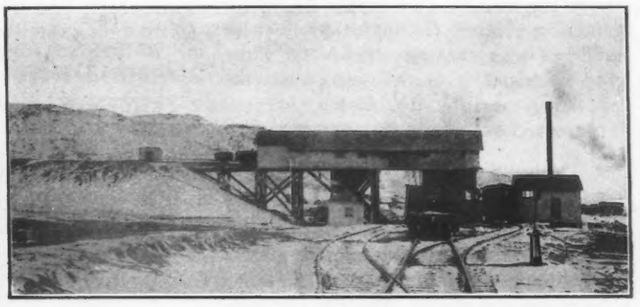
*Consulting mining engineer, Morgantown, W. Va.

tipple is equipped with shaking screens which divide the coal into three smaller sizes.

This is the shaft for mine *E*, the latest to be developed. The slope entry of mine *E* will eventually connect with mine *B*, and everything below *B* will be handled over this tipple, which is also equipped with an Ottumwa cradle box-car loader, handling 100,000 lb. cars, and operated by a 25-h.p. engine.

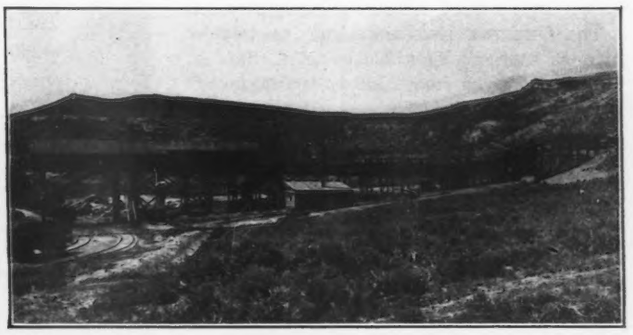
The shaking screens are run by a 35-h.p. motor and the conveyers by a 7-h.p. motor.

SUPERIOR COAL COMPANY DEPARTMENT STORE

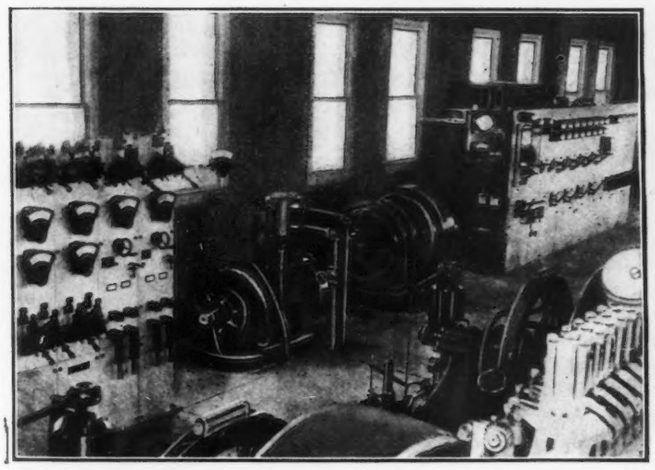


SHOWING THE DUMP AT "A" MINE, SUPERIOR, WYOMING

VIEW OF "E" TIPPLE OF SUPERIOR COAL COMPANY



GENERAL VIEW OF DUMP AT THE "C" MINE



ONE SIDE OF POWERHOUSE SHOWING D. C. AND A. C. SWITCHBOARDS

VIEW OF BOILERHOUSE SHOWING FOUR 250-HORSEPOWER MURRAY BOILERS

OTTUMWA BOX-CAR LOADER USED

The tipple at mine *A* is located at the top of a plane. The foot of the slope is 3600 ft. and the grade is 4 per cent. The slope is equipped with a 200-h.p. D.C. hoist, with motor generator set. On the plane is a 35-h.p. A.C. hoist for dropping the loads to the dump and returning the empties. The dump is equipped with a Phillips automatic cross-over and kick-back, pit scales, and two sets of railroad scales, for box-car track and open car track. Mine *A* tipple has an ordinary Ottumwa box-car loader, operated by steam from a 50-h.p. internal furnace boiler. Mine *A* is a room-and-pillar mine, in the No. 1 seam about 7 ft. 6 in. thick, having three parallel entries (a slope, manway and return air course). Its output is 900 tons a day. The seam pitches to the northeast about 4 deg. 30 min., and the rooms are driven 25 to 27 ft. wide, on 55-ft. centers, and parallel to the slope.

Mine *B* is in the No. 7 seam, and is a drift mine, the main slope being over one mile in length, with an inclined plane from above, from which cross entries are turned. Haulage is done with a 10-ton General Electric locomotive which pulls from the drift and on one dip entry, where the maximum grade does not exceed 4 per cent.

The plane is equipped with a 75-h.p. A.C. Vulcan hoist with Westinghouse motor, which pulls up the empties and lets down the loads on the main entry. The present output of mine *B* is 800 tons, but the equipment provides for an ulti-

mate output of 1500 tons. It also, is a room-and-pillar mine, with 30-ft. rooms on 55-ft. centers.

Mine *C* is a slope mine in the No. 1 seam, with 26-ft. rooms on 50-ft. centers. The gathering is done by a 10- and a 4-ton General Electric locomotive, and the 1500 ton output is hoisted up the slope by a General Electric 200-h.p. hoist with motor generator set. Horses and mules are also used in all the mines for gathering. Mine *C* tipple is likewise equipped with shaking screens for three grades of coal, and an Ottumwa box-car loader operated by two 50-h.p. internal furnace boilers.

Equipment at Mine D

Mine *D* is one of the latest developed mines, in the No. 1 seam, and has one 4-ton General Electric locomotive and is being equipped with mining machines and a hoist for the slope. The present output is 750 tons per day, but is being rapidly raised to the ultimate output of 1500 tons provided for in the equipment.

The Ottumwa box-car loader at this plant is operated by a 220-volt A.C. motor stepped down from 2300 volts and developing 50 horsepower.

The ventilation at all the mines is by Sturtevant electric fans 44 in. in diameter two of them running at 650 r.p.m. and two at 550 r.p.m. These are all operated by a direct-connected motor, on A.C. current at variable speed. Two of the fans are constructed to give 40,000 cu.ft. and two of them 60,000 cu.ft. against a 2-in. water-gage, but they are all actually producing double this quantity against a 1½-in. water-gage. These fans, being small and portable, can be hauled, motor and all, on a wagon, from place to place, and set up in 24 hours.

The company keeps one extra fan for emergency. Owing to the configuration of the country and the variations in the formation, the mines are divided into ventilation districts, so that no more air is ever needed in any one district than one fan can furnish. There is one split on each entry, and a common return. Whenever so many splits are necessary as to exceed the ventilating capacity of one fan, a new district is created and another fan placed.

The Hydraulic Cartridge Adopted

All the mines have several escapeways, which are now used for or can readily be converted into intakes. The company has recently adopted the hydraulic mining cartridge as a substitute for explosives in these mines, and to increase the amount of lump coal in the output. The rooms now being driven will be widened, under this method, which does not shatter the roof rock, and the output will, therefore, be materially increased with the same number of working places.

The accompanying sketch shows a type form under which these mines are developed and the manner in which the district ventilation is carried on.

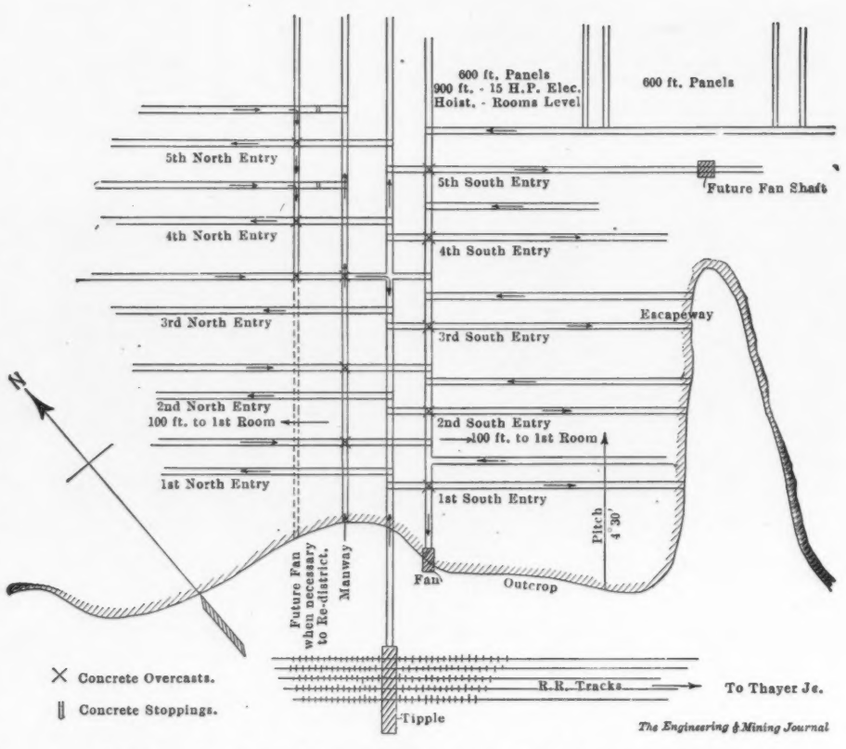
The camp was first opened in 1906, and the company office is of concrete, 1½ stories, steam-heated, with vault, and elaborately equipped office rooms for superintendent, clerks and engineers. A large department store which would be a credit to any city, is maintained, in a concrete T-shaped building, 40x120 ft., with wings 40x80 ft., with an octagonal office in the center, and a cellar under all.

Miners Comprise 26 Nationalities

Shortly, after the completion of the camp, a State bank was organized with a capital stock of $10,000, and at the end of the first six months of its existence, it had deposits exceeding $40,000 made by the miners in the company's employ. These miners comprise 26 different nationalities, among them, English, Irish, Scotch, German, French, Austrian, Italian, Montenegrin, Hungarian, Slav, Finnish, Japanese, Spanish, Mexican, Welch, Dalmatian and Korean.

The total population of the camp exceeds 2000, and the company has provided a school house accommodating 200 children, and employing 4 teachers. In addition to a number of private residences there are 300 three-, four- and five-room tenement houses, a public hall for lodges, an opera house, seating 500, a bungalow heated from the office steam plant, and a fine residence for the superintendent.

Although the mines are never gaseous, the company has 18 sets of safety lamps and rescue apparatus on hand, and maintains a perfectly equipped hospital with accommodations for 12 cots. There is little or no water in the mines at the present time, although a 5 and a 10-h.p. triplex electric pump are provided for future use. The reservoir furnishing the camp with water for household use, power purposes, and fire protection is supplied from 7 drilled wells, each 600 ft. deep, and more wells are now being sunk. The entire camp is electric lighted, and presents a welcome sight in an otherwise arid spot, far removed from any large towns.



General Plan of Development Mine "C". Course of Air is Shown by Arrows

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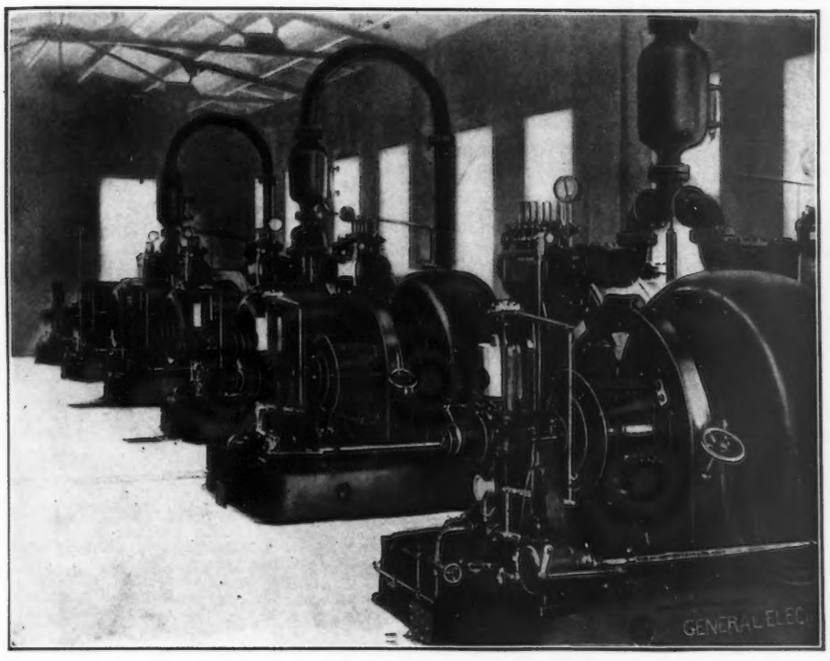
The only paying mines in Panama are in the Darien district 100 miles south of Panama. Here the Darien Gold Mining Company operated by a Manchester (England) Corporation, stock of which is owned in Paris, has been paying dividends of 25 per cent. per annum, for over 20 years. The ore is free-milling gold quartz running 40 per ton. The original vein worked was much richer, running 100 per ton, on which a 40-stamp mill was built, this mill has been in continuous operation and is said to make a 90 per cent. extraction. The company has just completed 50 km. of narrow-gage road to connect Camp Cana, with water transportation at a point on the Rio Tuayra.

Summer Session of the Coal Mining Institute of America

SPECIAL CORRESPONDENCE

The summer meeting of the Coal Mining Institute of America was held in Uniontown, Penn., June 28-29. In addition to the reading of many interesting papers the visiting members were taken on an inspection tour over the works and mines of the Continental No. 1 plant of the H. C. Frick Coke Company. At Continental, the visitors found the only coke-leveling machine in that section in operation. This machine levels the charge in beehive ovens and is a big labor saver. At this plant the ovens are drawn by machinery. The visitors were also interested in the system whereby the waste energies of the coke oven are used to generate the power utilized in operating the plant.



POWERHOUSE SHOWING 2 D. C. TURBO-GENERATOR 300-KW., AND FOUR A. C. TURBO-GENERATORS 300 KW., AT SUPERIOR, WYOMING

After Mr. Fitch, of the Elkins Coal and Coke Company, in West Virginia, had finished reading his paper on "The Systematic Handling, Disbursement and Accounting of Mine Supplies," W. E. Fohl then presented his idea of an ideal mine layout; this was followed by a paper on "Mining Towns and Mining Houses," by W. M. Judd, of Pittsburg. A most interesting and animated discussion followed the reading of Mr. Fohl's paper. The layout designed by Mr. Fohl is with particular respect to the distribution of air and the use of swinging doors, these latter not requiring an attendant.

The doors planned in the design would not interfere with the operation. Those on the haulageways would simply be forced open by the motors. This feature was criticized to some extent, but Mr. Fohl would not admit that the mine equipment would be damaged by the doors. The layout submitted, provided for motor haulage, assuming the field of coal to lay regular and the grade toward the shaft. The plan is for a two-sided mine, with workings on both sides. The air current is split at the shaft, giving two independent air currents into the mine, cut through to the haulage parts. The inlets to the haulageways can be cut off by masonry stoppings. The circular air shaft is isolated from the shaft's bottom, and located on the outer side of the workings are the outlet air passages, used only for this purpose.

HOISTING SHAFT IS ELLIPTICAL

The hoisting shaft of the proposed mine is of elliptical shape and composed of four compartments, two for hoisting the loads and two for the intake air. The intake arrangement is divided in the same manner as the air shaft, dividing into two directions. Two intake air currents are carried back at the same time, one on each side of the main heading. This intake air is cut off by six swinging doors. The air currents are kept traveling and the doors shut off the heavy currents, confining them to one airway on each side. The heavy currents of air are diverted by these doors to the two outside headings and confined there. A slope entrance is provided for the men.

The mine is designed to keep the heavy air currents off the loaded trips, and the men working in the main heading near the hoist shaft. Mr. Fohl claims that his plan does away with the necessity of changing the air currents with the seasons of the year. Swinging doors are also provided to give access to the headings.

It was generally agreed by those present that the necessity for the doors would be eliminated if the roof was sufficiently high in the main heading to enable the air current to pass above the loads and the men. The discussion was closed after it was finally decided that Mr. Fohl submit a cut of the map, together with a written explanation, to the members, who will be requested to prepare written criticisms for discussion at the winter meeting.

MINE FIRES

Another paper that received favorable comment was prepared and read by Thomas K. Adams, and dealt with the subject of mine fires. In concluding his paper, Mr. Adams said: "To deal successfully with mine fires, the human factor engaged counts for more than anything else. The ideal man to cope successfully with mine fires must have decision of character, good judgment and general intelligence, be physically strong and not afraid to use his strength. Courage, great tenacity and persistency must also be present. When conditions have been well considered and methods of operation agreed upon, do not allow anything emanating from irresponsible parties to interfere in the carrying out of the proposed plan."

COALFIELDS OF ILLINOIS

An interesting talk was delivered by Prof. H. H. Stoek on "The Coalfields of Illinois." Professor Stoek dealt especially with the commission form of government that has been applied in several instances during the past few years in Illinois. One commission, known as the Mining Investigation Commission, was appointed to revise the entire State mine law and report at the next regular session of the Legislature. This commission has already presented a preliminary report, and a law requiring fire-fighting appliances has been passed as a result of the Cherry disaster. Another commission has been appointed by the Governor to establish and oversee the work of three rescue stations, to be located in different sections of the State for use in emergency. All mining examinations in the State are held by the mining board appointed by the Governor. Professor Stoek showed that Illinois has a number of features in connection with its mining industry that are distinctive and qulte different from other mining sections of the United States.

Before adjourning the institute adopted a resolution for presentation to President Taft, suggesting the appointment of Dr. J. A. Holmes as director of the National Bureau of Mines.

MINING AND METALLURGICAL PATENTS

A CLASSIFIED LIST OF NEW INVENTIONS

A copy of the specifications of any of these patents issued by the United States Patent Office will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. British patents are supplied at 40 cents. In ordering specifications, correspondents are requested to give the number, name of inventor and date of issue.

COAL AND COKE

COAL-WASHING APPARATUS. Harvey Cory, Pittsburg, Penn., assignor to Pittsburgh Coal Washer Company, Pittsburg, Penn. (U. S. No. 963,519; July 5, 1910.)

COKE—Improvements in or Relating to Apparatus for Conveying, Cooling and Discharging Incandescent Coke and the Like. Berlin-Anhaltische Maschinenbau-Actien Gesellschaft, Berlin, Germany. (Brit. No. 18,908 of 1909.)

COKE—Improvements in or Relating to Coke Ovens. Frederick W. C. Schniewind, New York. (Brit. No. 10,484 of 1909.)

COKE—Improvements in Spreaders for Coke Ovens. Brown Hoisting Machinery Co., Cleveland, Ohio. (Brit. No. 27,262 of 1909.)

COKE OVEN. William H. Blauvelt, Syracuse, N. Y. (U. S. No. 963,681; July 5, 1910.)

COKE-OVEN DOOR. Frederick D. Buffum, Howard N. Eavenson, and Edward O'Toole, Gary, W. Va., assignors to United States Coal and Coke Co., Pittsburg, Penn. (U. S. No. 962,123; June 21, 1910.)

CRUSHING—Improvements in or Connected with Breakers of the Roller Type for Breaking Coal, Coke and Other Materials. Oswald Hooker Ingham, South Shields, Eng. (Brit. No. 12,087 of 1909.)

MINING MACHINE—Coal-Mining Machine. Lotte Kovatch, Oliveburg, Penn. (U. S. No. 960,598; June 7, 1910.)

PEAT—Drying Apparatus. William H. Bradley, Chicago, Ill. (U. S. No. 962,118; June 21, 1910.)

SAFETY LAMPS—Improvements in Safety Lamps for Indicating Fire Damp. Ralph D. Cochrane, Hetton-le-Hole, Durham, England. (Brit. No. 19,985 of 1909.)

SEPARATOR—Centrifugal Coal Separator. Nelson Mowery, Wilkes-Barre, Penn. (U. S. No. 964,444; July 12, 1910.)

COPPER

MATTE TREATMENT—Wet Treatment of Mattes. James Taylor Carrick, Johannesburg, Transvaal, assignor of one-half to Stuart Pattison, Johannesburg, Transvaal. (U. S. No. 961,934; June 21, 1910.)

PYRITIC SMELTING—Method of Making Sulphuric Acid from Smeltery Gases. J. Parke Channing and F. J. Falding, New York. (U. S. No. 962,493; June 28, 1910.)

PYRITIC SMELTING—Method of Smelting Pyritic Ores. J. Parke Channing and F. J. Falding, New York. (U. S. No. 963,020; June 28, 1910.)

GOLD AND SILVER

AMALGAMATING MACHINE. John S. Rayburn, Grand Junction, Colo. (U. S. No. 962,466; June 28, 1910.)

AMALGAMATING RIFFLE. Ezra S. Hoyt, San Luis Obispo, Cal., assignor to Black Sand Mining Co., Los Angeles, Cal. (U. S. No. 963,005; June 28, 1910.)

AMALGAMATOR. Alice J. Smith and Henry W. Kent, Milwaukee, Wis., assignors to Kent Ore Reduction Co., Chicago, Ill. (U. S. No. 961,905; June 21, 1910.)

FILTERS—Improvements in Filters for Metallurgical and Other Uses. Harold Binney, Virginia City, Nev. (Brit. No. 28,625 of 1909.)

ORE TREATMENT—Process of Treating Precious Metal-Bearing Materials containing Sulphides. Paul W. Avery and Eugene C. Knowles, Deadwood, S. D. (U. S. No. 963,111; July 5, 1910.)

PLACER MINING—Means for Extracting Gold from River Beds. John H. Batten, Jamestown, Cal. (U. S. No. 962,612; June 28, 1910.)

REFINING—Process of Refining Gold. Heinrich Wohlwill, Hamburg, Germany, assignor to the firm of Norddeutsche Affinerie, Hamburg, Germany. (U. S. No. 961,924; June 21, 1910.)

IRON AND STEEL

MANUFACTURE — An Improved Process for the Production of Iron, or Steel, direct from Iron Ore. William A. Hargreaves, Woodville, So. Aust. (Brit. No. 18,349 of 1909.)

ORE TREATMENT—Apparatus and Process for Preparing Pulverous Iron Ores and the Like for Smelting in Blast Furnaces and Use in Open-Hearth Furnaces. Sidney Cornell, Duquesne, Penn. (U. S. No. 962,006; June 21, 1910.)

SLAG—Process and Apparatus for Making Slag Shingles. Hyleman Alison Webster, Columbia, Tenn., assignor of one-fourth to Archelaus M. Hughes, Columbia, Tenn., one-fourth to John W. Conner, Knoxville, Tenn., and one-fourth to Ernest W. Bradford, Washington, D. C. (U. S. No. 964,348; July 12, 1910.)

SLAG CEMENT—An Improved Process of Manufacturing Cement from Blast-Furnace Slag. Wilhelm Lessing, Rheinland, Germany. (Brit. No. 3016 of 1910.)

LEAD, ZINC AND OTHER METALS

ALUMINUM — Reduction of Refractory Compounds. Frank J. Tone, Niagara Falls, N. Y. (U. S. No. 961,913; June 21, 1910.)

BAUXITE—Process of Purifying Aluminous Materials. Lewis E. Saunders, Niagara Falls, N. Y., assignor to Norton Co., Worcester, Mass. (U. S. No. 960,712; June 7, 1910.)

NICKEL—Improved Process for the Manufacture of Pure Nickel. La Société Electro-Metallurgique Francaise of Frages, Isere, France. (Brit. No. 287 of 1910.)

TIN—Improvements Relating to the Dissolving of Impure Tin or Tin Alloys Chiefly for Obtaining Tin or Tin Compounds. Guy de Pechi, Essex, and Frederick C. Blythe, Church, Eng. (Brit. No. 16,053 of 1909.)

ZINC—Apparatus for Smelting Ores Yielding a Volatile Metal. Woolsey McA. Johnson, Hartford, Conn., assignor to Continuous Zinc Furnace Co., Hartford, Conn. (U. S. No. 964,268; July 12, 1910.)

ZINC—Extraction of Zinc. Charles Skinner Brand, Troon, Scotland, assignor to Brand's Pure Spelter Co., Ltd., Glasgow, Scotland. (U. S. No. 963,416; July 5, 1910.)

ZINC—Process for Treating Zinkiferous Substances. Guido Mojana, Milan, Italy. (U. S. No. 961,514; June 14, 1910.)

MINING—GENERAL

BLASTING—Improved Means for Propagating the Ignition or Detonation of Explosive Charges for Mining and Other Purposes. Société Anonyme d'Explosife et de Produits Chimiques, Paris. (Brit. No. 8337 of 1910.)

CAGES—Improvements in and Relating to Pit Cages in Mines. William Jones and William T. Williams, Tredegar, Eng. (Brit. No. 19,729 of 1909.)

DRILLS—Improvements in Hammer Drills. Ingersoll-Rand Co., New York. (Brit. No. 12,893 of 1909.)

EXPLOSIONS — Improved Means for Quenching and Arresting Explosions in Mines. Ralph D. Cochrane, Hetton-le-Hole, Eng. (Brit. No. 14,865 of 1909.)

MINE-CAR WHEEL. Thomas Donohoe, Avella, Penn. (U. S. No. 960,852; June 7, 1910.)

MINING CAR. James Blair, St. Benedict, Penn. (U. S. No. 959,294; May 24, 1910.)

MINE-DOOR OPERATING DEVICE. Frederick C. Todd, Philipsburg, Penn. (U. S. No. 963,260; July 5, 1910.)

PROPS—Improvements in or Relating to Mine Props and Joists for Shoring. Wilhelm Binder, Altenessen, Germany. (Brit. No. 3636 of 1910.)

TUNNEL SUPPORT. Christopher Columbus Finlayson and James Nathan Cain, Bisbee, Ariz. (U. S. No. 963,536; July 5, 1910.)

VENTILATING APPARATUS. William Clifford, Jeannette, Penn. (U. S. Nos. 963,277, and 963,278; July 5, 1910.)

ORE DRESSING—GENERAL

CONCENTRATION — Ore Concentration. Henry Livingstone Sulman, Henry Howard Greenway, and Arthur Howard Higgins, London, England. (U. S. No. 962,678; June 28, 1910.)

CONCENTRATION—Riffle for Concentrating Tables. Albert M. Kemp and Merton W. Loomis, Denver, Colo., and Joseph E. Fitzwater, Rossville, Ill. (U. S. No. 963,582; July 5, 1910.)

CONCENTRATOR—Ore Concentrator. Lucien I. Blake, Boston, Mass. (U. S. No. 964,083; July 12, 1910.)

CONCENTRATOR—Ore Concentrator. Seth R. Swain, Denver, Colo., assignor to Swain Concentrator Co. (U. S. No. 962,990; June 28, 1910.)

CRUSHING—An Improvement in or Applicable to Apparatus in which Wet Crushing is Employed for Extracting Metals from Ores. James E. Horsfield, Gadzema, Rhodesia. (Brit. No. 11,406 of 1909.)

CRUSHING—Reduction Machine. John E. Blake, Pittsburg, Penn., assignor to Blake Crusher and Pulverizer Company, Pittsburg, Penn. (U. S. No. 963,353; July 5, 1910.)

CRUSHING—Roller Crushing Mill. Peter Edwin Van Saun, New York, N. Y. (U. S. No. 964,070; July 12, 1910.)

DRY-ORE SEPARATING MACHINES. William W. Bonson and Willson L. McLaughlin, Dubuque, Iowa. (Brit. No. 18,444 of 1909.)

ORE CLASSIFIER. Frank G. Janney, Salt Lake City, Utah. (U. S. No. 964,261; July 12, 1910.)

ORE-GRINDING MACHINE. Charles R. Hotchkiss, Oakland, Cal., assignor of one-half to George S. Montgomery, Oakland, Cal. (U. S. No. 964,024; July 12, 1910.)

ORE-SIZING APPARATUS. Charles Pierce Watterson, McGill, Nev., assignor of one-fourth to Horace R. Graham, McGill, Nev. (U. S. No. 963,488; July 5, 1910.)

SCREEN—Vibrating Screen or Separator. Thomas Leggett Sturtevant, Quincy, and Thomas Joseph Sturtevant, Wellesley, Mass., assignors to Sturtevant Mill Co. (U. S. No. 961,467; June 14, 1910.)

SEPARATION—Improved Process for the Separation of Complex Ores. William Morley Martin, Redruth, Cornwall, Eng. (Brit. Nos. 4531, 18,176 and 18,178 of 1909.)

SLIME TREATMENT—Apparatus for the Treatment of Metal-Bearing Slimes. Clyde H. Jay, Salt Lake City, Utah. (U. S. No. 963,710; July 5, 1910.)

METALLURGY—GENERAL

AGGLOMERATING—Method of and Apparatus for Agglomerating Fine Ores, Metalliferous Residues and the Like. Carl Dellwik, London, Eng. (Brit. No. 13,073 of 1909.)

ELECTRIC FURNACES — Improvements Relating to Electric Furnaces. Johannes Harden, London, England. (Brit. Nos. 26,251 and 26,266 of 1909.)

ELECTRIC SMELTING—Method of Reducing Refractory Material. John W. Evans, Belleville, Ont. (U. S. No. 960,863; June 7, 1910.)

ORE TREATMENT—Apparatus for Electrical Treatment of Ores. William B. McPherson, Los Angeles, Cal., assignor of one-half to Gail Borden, Los Angeles, Cal. (U. S. No. 962,040; June 21, 1910.)

REGENERATIVE REVERBERATORY FURNACE. Frederick A. Leas, Oakland, Cal. (U. S. No. 962,644; June 28, 1910.)

REVERBERATORY FURNACES—Feeding Device for Reverberatory Furnaces. Samuel Richard Garr, Garfield, Utah. (U. S. No. 961,768; June 21, 1910.)

TUYERE RECEIVER for Smelting Furnaces. John O. Bardill, Herculaneum, Mo. (U. S. No. 962,112; June 21, 1910.)

WATER JACKETS—Stay or Support for Water Jackets. Samuel W. Traylor, Allentown, Penn., assignor to M. P. Schantz, trustee for the Traylor Engineering Co. (U. S. No. 960,737; June 7, 1910.)

PERSONAL

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

C. F. Parker, who is operating in Durango, Mexico, is in New York.

S. J. Lewis is now with the Cinco Minas Company, in Jalisco, Mexico.

Isaiah Nichol, of St. Clairsville, O., has been appointed receiver of the Gorrell Coal Company.

W. Randolph Van Liew has been appointed general manager of the Caucasus Copper Company, at Dzansoul, Russia.

H. B. Price is now mill superintendent and Robert Gordon is mine superintendent of the Montezuma mines of Costa Rica.

W. G. Mather, president of the Cleveland-Cliffs Iron Company, has returned from an extended trip through Europe and Egypt.

N. O. S. Ford is making an examination of the Taviche camp, Oaxaca, Mexico, for Baltimore interests, planning a custom mill for the camp.

The British Royal Society of Arts has awarded its Albert medal for 1910 to Madame Curie, of Paris, for her share in the discovery of radium.

S. E. Bretherton has returned to San Francisco from Shasta county, Cal., where he is having work resumed in the mines of the Afterthought Copper Company.

Dr. E. R. Buckley made an address to the members of the Ore Producers' Association and the Commercial Club, at Joplin, Mo., July 14, a large number attending.

F. W. Draper has returned from a two years' engagement in the Ural mountains, Russia, and is now connected with the Arizona Smelting Company, at Humboldt, Arizona.

D. H. Newland, assistant State geologist of New York, sailed from New York July 21, on his way to attend the International Geological Congress, at Stockholm, Sweden.

Sydney H. Ball, directing geologist for the Societé Internationale Forestiere et Miniere du Congo, will leave New York about Aug. 6, to make some mine examinations in Siberia.

Ezequiel Ordonez, geologist for the Real del Monte Company, in Mexico, was in New York this week, on his way to attend the International Congress, at Stockholm, Sweden.

Stanley C. Sears has been appointed general manager of the Mexican Consolidated mines, in the Guanacevi district, Durango, Mexico. He was recently at the Velardeña mines.

J. C. McDonald has resigned his position as general passenger agent of the National Railways of Mexico, to become assistant-general manager of the Waters-Pierce Oil Company.

F. C. Brown has resigned his position as general manager of the Waihi Grand Junction and Komata Reefs mines, in New Zealand. He is at present making his headquarters at Boise, Idaho.

C. K. Hitchcock, Jr., of Houghton, Mich., formerly with the Quincy and more recently with the Adventure Copper Company, has been appointed manager of the Lake Copper Company.

Joseph W. Heffer, who has been connected with the Republic Iron Works, Pittsburg, for 20 years, went South July 20 to take charge of the office of the Shelby Iron Company, Shelby, Alabama.

John Pender, of John Pender & Co., Brunswick, Victoria, Australia, is making a tour of the United States, visiting rolling mills and other industries in which he is interested. Mr. Pender's firm is the largest iron manufacturer in Australia.

Prof. John Jermain Porter, metallurgical engineer, University of Cincinnati, Ohio, announces that he will undertake investigations in cast iron and in efficiency of raw materials, plants and operation, particularly in foundry and blast furnace plants.

Carl F. Dietz, of the firm of Dietz & Keedy, Boston, sailed for Europe on professional business last week; he will attend the joint meeting of the Mechanical Engineers, at Birmingham and London; thereafter going to Paris and Berlin on business for his firm.

Courtenay De Kalb has resigned his position as one of the editors of the *Mining and Scientific Press*, of San Francisco, to become general manager of the Pacific Smelting and Mining Company, of Sonora, Mexico. His successor on the *Press* will be Thomas T. Read, now of the Imperial Pei-Yang University, at Tientsin, China; but Mr. Read will not come to San Francisco for some months yet.

OBITUARY

Joseph R. Stauffer died at Scottdale, Penn., July 14, aged 74 years. He was president of the Meyersdale Coal Company and was interested in other coal operations.

Capt. F. P. Mills died at Cedar Edge, Colo., recently. He was well known in the Lake Superior iron country, having been for many years in charge of the Cleveland mine, near Ishpeming.

Charles P. Holt, of Santa Ana, Cal., died about July 20, at Cisneros, Colombia, aged 75 years. He was on an exploring and prospecting trip up the Magdalena river at the time. He had been for over 30 years engaged in mining and prospecting in Arizona and Nevada, and was an early prospector in Alaska also. He was one of the locators of the Jumbo and Red Top mines at Goldfield, but later sold out his interests and went to live at Santa Ana. A retired life wearied him, however, and he started for Colombia a few months ago.

John Sutcliffe died at Bellevue, Penn., July 23, aged 73 years. He was born in England, but came to this country when a young man and for many years made his home at Poughkeepsie, N. Y., practising as a civil and mining engineer. He built the Phillipse Iron Works at Cold Spring, N. Y., and the Hudson River Iron Works, at Poughkeepsie. For 10 years, about 1875-1885, he was managed for the Vallecille Silver Mining Company in Mexico. He was a member of the Canadian Mining Institute, of the American Institute of Mining Engineers, and of the Engineers' Club of New York.

SOCIETIES and TECHNICAL SCHOOLS

University of Arizona—A valuable collection of minerals, chiefly from South Africa, has been presented to the Geological Department at Tucson by J. Brazil, who recently returned from that country.

British Society of Mining Students—At the annual meeting, held June 21, it was decided to wind up the affairs of this society at the end of the fiscal year. Accordingly, the society ceased to exist on June 30, last.

Alabama Coal Operators' Association—The annual meeting of the coal-mine officials under the auspices of this association was to be held at East Lake Park, near Birmingham, Ala., July 30. On the program are the following papers:

1. "Mine Rescue Work," by J. J. Rutledge, United States Geological Survey.
2. "Use of Electricity in Woodward Iron Company's Mines," by W. W. Bush, general superintendent of the company.
3. "Safety in Coal Mines," by Edward H. Coxe, general superintendent, coal mines and coke ovens, Tennessee Coal, Iron and Railroad Company.
4. "Precautions in Use at Mulga Mines before and after April 20," by Milton H. Fies, general superintendent of coal mines, Birmingham Coal and Iron Company.
5. "Mine Gases," by J. W. Groves, lecturer for Tennessee Company.
6. "Mine Inspection and Ventilation," by Edward Flynn, inspector of coal mines for Tennessee company.
7. "The Use of Sprays at Banner Mine," by Erskine Ramsey, chief engineer Pratt Consolidated Coal Company.
8. Address, by James Hillhouse, chief State mine inspector.

In addition there will be a general discussion of the topics presented by the mine superintendents and foremen who are at the meeting.

EDITORIAL CORRESPONDENCE

Reports From Our Own Representatives on Important Events From Many Important Mining Centers of the World

San Francisco

July 24—It is reported that the local coal trust of California, the Western Fuel Company, owning 35,000 acres of coal at Nanaimo and other points on Vancouver island, has been sold to a British syndicate for $3,250,000. About eight years ago the Western Fuel Company took over the holdings of John Rosenfeld & Sons, of San Francisco, at Nanaimo, and other interests, and after a prosperous operation of these coal mines turned over the lands and mines, with valuable timber rights, at a profit of about $2,000,000.

It has been the policy of the office of the supervising architect of the Treasury department to import marble and other stone in constructing public buildings in California. As this State abounds in fine building stone (marble, granite and sandstone) as well as fancy stones, such as Mexican onyx, the State Mineralogist is taking up the matter, and hopes with the help of the California congressional delegation, to have California stone used on the Federal buildings here in the future, especially as these building materials can be supplied from a local source cheaper than the imported.

A magnesite deposit of considerable extent and of high grade, is reported to have been discovered near Portola, a station on the Western Pacific railroad, in Plumas county. It is planned to make magnesia brick at this place.

Denver

July 25—The Portland Gold Mining Company's new 300-ton mill, erected at the mine near Victor, at a cost of $250,000, has sent out its first bullion valued at about $9000, and held a formal opening June 19, at which all the mine managers of Cripple Creek, bank presidents, railway heads, and metallurgists from other parts of the State were present. The process of reduction at the Portland mill is described as cyaniding, together with what is called a secret process, owned by the company. The mine is producing 550 tons per diem, 300 tons of which is treated at this mill, and not the dump ore, as has been stated. The president informed the visitors that the mill was running at a profit, and the percentage of saving higher than was expected, but no official statement was made of the grade of ore being milled, or the cost of treatment. The capitalization of this company is $3,000,000, and the dividends paid to date amount to $9,037,080.

Twenty-five miles from Georgetown, on Bard creek, is the new camp of Beshear, which is attracting number of prospectors, owing to the discovery of sylvanite ore carrying high gold values, and said to be identical with that mined at Cripple Creek, which, of course, adds to the excitement. Free gold, or as it is locally termed, "rusty gold," the result of oxidation of the tellurium, is also found, and it is stated that upward of 500 locations have been made in the past 10 days. Most of the claims are at timber line, and there are said to be already 200 prospectors in there.

In the Silverton district, the Iowa-Tiger, a silver-lead mine, an extension of the Silver Lake vein, is to the fore with a strike of gold ore, one of the surprises for which the San Juan region is now becoming famous. It was discovered in the same way that has so often happened in this State, where the foreman or superintendent picks or shoots into the "well defined wall" of his lode, and finds it carries ore. In this case it is free gold, and about 6 in. in width.

The approaching connection of the deep drainage tunnel with the El Paso workings, and the expected unwatering of most of the deep mines of Cripple Creek, is stimulating new operations in a large degree. One instance of this is the Moon-Anchor, on Gold hill, which has produced $1,500,000 in the past, and struck water at 960 ft. Work is to be resumed on company account about Aug. 1.

On representations by the Ouray and the Silverton commercial clubs that these camps have an immense tonnage of low-grade ore that would be shipped if they could get reduced freight rates, the Denver & Rio Grande railroad investigated the matter, and as a result the following reductions have been made to take effect in August: Zinc ore from Silverton to Buena Vista, which has heretofore had no rate on this ore, is to be given a $5.50 rate, for the benefit of the new smeltery. There also will be a decided reduction in the rate on ore from Silverton to both Salida and Buena Vista.

The smeltery at Durango will be favored by a reduction in the rate on lead bullion to Pueblo, from $9, the present rate, to $7.50. This rate will carry what is known as $100 bullion. This does away with the foolish talk that was indulged in about the railroad being in league with the Smelter trust against the Kuenzel plant at Buena Vista.

Butte

July 24—The report of the Government assay office at Helena, for the fiscal year ended June 30, shows an increase of $192,000 over the year previous. Total receipts for the year amounted to $1,969,605. The several counties produced as follows: Beaverhead, $866; Broadwater, $9882; Choteau, $659,591; Deer Lodge, $9366; Fergus, $637,948; Granite, $16,871; Jefferson, $10,518; Lewis & Clark, $112,572; Lincoln, $1352; Madison, $391,053; Missoula, $41,244; Meagher, $782; Park, $296; Powell, $31,901; Ravalli, $5243; Silver Bow, $11,475.

Former Senator Clark has recently returned to Butte, where he will remain the rest of the summer. In regard to his plans, he states: "I shall devote my attention in Butte to developing the great zinc deposits of this district, which ore will be treated at the concentrator of the Butte Reducion Works, which I shall continue to operate. I am not disposing of my holdings in this State, and, in fact, am increasing them. I shall engage in active prospecting for zinc in other properties I own in Butte, having demonstrated to my satisfaction that the production of zinc is a success. If I could make a favorable arrangement with the stockholders of the Butte & Superior company, I would finance and operate that property as well as my own."

Salt Lake City

July 24—The Utah Consolidated has reduced its working force, awaiting the time when the International company will be ready to receive the tonnage contracted for. The old smelting contract with the American Smelting and Refining Company has been completed. The last ore was delivered under this contract July 10. It is estimated that when the company is shipping at the rate of 1000 tons of ore daily, the annual production will be about 13,000,000 lb. of copper, which with the marked saving in transportation charges and dividends from the International Smelting company will provide the usual earning of $2 per share per annum. While 1000 tons is generally mentioned as the tonnage to be delivered, the International contract calls for the output of the mine up to maximum of 1200 tons of ore per day. The capacity of the tram is 1000 tons for 10 hours.

The incline from the ninth level, which is being driven for prospecting, has reached the tenth level, a station has been cut and drifting started. The in-

cline shows no evidence of disturbance or faulting, so that the new orebody developed on the ninth level has good chances for extending to this depth. Several hundred feet of drifting will be necessary from the tenth level station to reach the place where ore may be looked for. Everything has been put in shape for producing 1000 tons per day, and this can easily be done with the mine in its present condition. The vertical shaft from No. 7 level will be used for hoisting ore, which will be stored in bins at the loading station of the tramway at the mouth of No. 7 tunnel. These bins have a capacity of 1200 tons. The shaft is at the ninth level and will be continued to the tenth, and connections made with the workings from the incline.

The tramway has been given a number of tryouts by the makers and while some difficulties were experienced at first in getting the loaded buckets over the top of the range and in the working of automatic grips at one of the tension stations, this has been largely overcome and when a few other rough edges are worked off, the line will be turned over to the Utah Consolidated as completed. Before the smeltery is blown in, 15,000 tons of ore will be delivered; of this, several thousand tons have been sent over.

The Pittsburg & Salt Lake Oil Company, developing at Spring Valley, Wyo., let two contracts, July 16, for the drilling or 32 and 9 wells respectively. Work on these wells will be started soon. The company has five producing wells at present and is extending its pipe line to the stock tanks of the Standard Reserve Oil Company, on whose territory a month ago a gusher was brought in. The new wells will cover 300 acres.

Circulars have been sent out by the traffic department of the Western Pacific railroad, which runs south of the Southern Pacific through Tooele county into Nevada, stating that preparations are being made to begin passenger service on the new road during the latter part of August. Modern steel coaches, dining cars and sleepers will be installed and the schedule for passenger trains will be published shortly. The Western Pacific will use the new Denver & Rio Grande depot jointly with the latter road.

Goldfield

July 24—The Supreme Court of Nevada has handed down an opinion defining the law in the matter of stamping stock certificates to distinguish between "treasury" and "promotion" stock of mining companies. The so called "wildcat" mining law passed by the last legislature provided for certain regulations in this connection to become effective April 15, 1909. Suit was brought to determine whether stock issued before this date, but presented for transfer after the law became effective, should be marked "treasury," or "promotion," upon reissue. While the necessity for stamping the reissued certificates under these conditions is denied, the opinion sets forth that stock issued subsequently to the date of enforcement, will be subject to the provisions of the act and must be stamped according to the nature of the stock.

The act was passed for the purpose of protecting investors by informing them of the exact nature of the stock which they were purchasing. "Treasury" stock is construed to mean stock actually set aside for the development of the property as distinguished from "promotion" stock issued to promoters, attorneys, engineers, etc., for services rendered, or to the original owners of the property. While the latter stock may be legitimately earned and issued it is maintained that the investor should be protected from having unscrupulous companies dispose of promotion stock under the pretext that the proceeds were to be used in the actual development.

Birmingham, Ala.

July 25—The Crittenden Home Association has been organized in Birmingham, the objects being to establish a home for the widows and orphans of deceased miners, iron and steel workers, and to maintain a pension fund for miners, and iron and steel workers who have become disabled by reason of age or accident. The home is to be independent, it is claimed by the promoters, of all labor organizations and is to be for all of the above classes regardless of their affiliation. It is the intention of the association to ask employers and employees to assist in establishing and maintaining this home, a fee of $1 per capita to be asked of the companies for each of their employees with 50c. per annum for the support of the institution; while the employees are to be asked to contribute $1 per capita for the membership and $1 per annum for the maintenance. The trustees are W. H. Priegel, Alfred Jefferson, Dr. R. C. Morefield, Judge M. H. Crittenden and Rev. W. F. White. A large tract of land has been secured on which the home will be established, convenient to the industrial section of Alabama.

Toronto

July 24—John Arbuthnot, president of the Pacific Coast Mines Company, is on his way to Montreal to conclude a deal with Sir Thomas Shaughnessy, for the purchase by the Canadian Pacific Railway, of the extensive colliery interests at South Wellington, Vancouver island. The purchase price is understood to be about $4,000,000. W. H. Aldridge, head of the Canadian Pacific Mining and Smelting department in British Columbia, recently investigated the property and reported favorably. It is understood that when the Canadian Pacific obtains possession of the mines, they will be extensively developed and the output largely increased. A shipping port in connection with the collieries has been established at Boat Harbor.

Daniel D. Mann, of Mackenzie & Mann, Toronto, who on May 7 obtained an option on the chemical process invented by Doctor Island for refining ore, has issued writs against Doctor Island and against the Island Smelting and Refining Company, for specific performance, and an injunction restraining them from dealing with the patent rights or disclosing, using or developing the processes or machines covered by the option. He also asks a declaration that he has an interest in the inventions and patents relating to the treatment of mineral ore as against Doctor Island. The defendants claim that Mr. Mann's option has lapsed.

Mexico

July 20—Owing to the sucessful operations of a few big companies in Pachuca, and particularly to the Santa Gertrudis negotiation, the district for many miles around has been staked out under denouncement. One or two other negotiations in the district have been carried through, partly on the strength of the Santa Gertrudis negotiation and there is a likelihood of considerable development and prospecting exploration activity in the district. It is well known that the district is by no means completely explored, and the probabilities are that the renewed activity will result in the development of important and new extensions of the old orebodies or of new veins in this extensive camp.

In general there is a considerable increase in activity in mining throughout the Republic. Recently there has been a tendency for the French capital to become extensively interested in Mexican mining. This is a result partly of the successful operations of the Dos Estrallas company, which was developed by Mr. Fournier and the stock of which is held largely in Paris.

Leopold Salazar, mining engineer of Mexico City, secretary of the Mexican Mining Institute, is writing a book entitled "The Mining Industry of Mexico." He has the coöperation of 23 mining engineers, among them being E. Girault, A. Grothe, J. J. Reynoso, José C. Haro, Walter Neal, Manuel Balarezo, Fernando Gonzalez, Robert Hay Anderson, Andres Aldesaro, J. Leslie Mennell and Bernard McDonald. The book will contain over 600 pages and will contain numerous engravings, plans, maps and views. It will be compiled from the archives of the Fomento department and from the State records and will be printed in Spanish and English. The book is of importance in connection with the need of authentic complete data concerning the mining resources of Mexico.

THE MINING NEWS

Reports of New Enterprises, New Machinery, Installations, Development Work and Property Transfers The Current History of Mining

Alaska

Alaska Mexican—For the month ended June 15 the mill crushed 19,439 tons, with a total realizable value of $69,866. The operating expenses were $27,282 and the net profit, $39,957; yield per ton, $3.59.

Alaska United—The report for month ended June 15 was: Crushed in Ready Bullion Mill (120 stamps) and 700-ft. Claim Mill (100 stamps) respectively 19,850 and 16,597 tons; realizable value, $42,817 and $33,489; operating expenses, $27,726 and $22,647; net operating profit, $15,091 and $10,842; yield per ton, $2.27 and $2.13.

Gold Dredging and Mining Company—The company has been formed and will operate on claims in the Nome district. J. D. Bennett, of Nome, is agent.

Arizona

Gila County

Miami—The company is installing three 500-h.p. Edgewood boilers with space for a fourth. Oil is to be the fuel at present, recent tests having shown that 17 lb. of water can be evaporated per lb. of oil as against 12.5 lb. with the coal at hand. The development has again touched the 1000-ft. mark, the curtailment of the past week being due largely to a break down of the compressor at No. 2 shaft. The 15th and 16th churn-drill holes are being sunk.

Superior & Boston—Most of the development at the mine is being done on the sixth level, which is 551 ft. below the collar of the McGaw shaft. The drift southeast on this level is progressing at the rate of 4 ft. a week. The McGaw shaft, the only one of the four shafts on the property at present being developed, is at 745 ft. When 770 ft. has been reached it is intended to establish the eighth level, which will run under the orebody on the sixth level above. A Prescott sinking pump is in use in the shaft as some water has been encountered.

Arizona Commercial—The orebody cut in sinking the Eureka shaft below the 700-ft. level, proved only a small detached body about 10 ft. thick. A diamond drill is operating and at 85 ft. below the 700-ft. level it ran through about 12 ft. of oxidized ore. This drill will continue to 1500 ft., and holes will be put down at three different points.

Calumet & Arizona—An authentic telegram of July 26, from Bisbee, says that the mine output has not been curtailed.

Graham County

Arizona Copper Company—For the half-year to March 31, subject to final adjustment, the free profits, including £39,994, brought forward from September 30, 1909, amount to £174,660. The dividends for the half-year on the "A" Preference shares and the 7 per cent. preference stock amount to £12,266, leaving a sum of £162,394. Out of this the directors resolved to pay July 30 an interim dividend of 1s. 3d. per share, on the ordinary share. This will leave a balance of £67,401.

Pinal County

Ray Consolidated—It is reported that the management now believes that not only one section of the concentrator, but two, will be started next January. The plant is being built in eight sections having a rating capacity of 600 tons each. It is expected that each of these will have an actual capacity of 1250 tons per day. At the smelting plant grading has been started. This plant, which is to have a capacity of 500 tons a day, is to be equipped with reverberatory furnaces, as now planned, but undoubtedly a blast furnace will be added later.

California

Amador County

Lincoln Consolidated—Work on this mine, at Sutter creek, has been commenced under superintendency of A. L. Noce. The shaft is being unwatered.

Calaveras County

Economic—Work on the lower levels of this mine, near Esmeralda, Oliver Reece, manager, has opened a 5-ft. vein of very good ore. A steam driven compressor and a gasolene engine are to be installed as auxiliaries.

Eldorado County

Gold Channel—Superintendent W. C. Green, of these mines, near Georgetown, has purchased a roller gravel mill for the Tiedermann claim, and another will shortly be added.

Humboldt County

Lyster, Willsie and Stephens have located and started work on three asbestos claims, near Soldier's Grove, on the ridge running down to Mad river, near Shower's pass.

Inyo County

Casa Diablo—An Ingersoll-Rand four-drill compressor is being installed at this property. Electric power will be used.

Lassen County

At Merrillville, the Corona group is being opened under superintendence of T. G. Elgie. The vein is wide. The Hinman-Taber group has also ben started and a 20-ft. shaft sunk.

Mono County

F. B. Remington, Samuel Musser and William Cahoon are installing a custom cyanide plant at Benton, where they have bought 15,000 tons of tailings from the Comanche mill.

Nevada County

Cassidy—The new surface plant of this mine, at Grass Valley, F. C. Longe, superintendent, has been completed. It is the intention to sink 1000 feet.

Central Consolidated—Extensive development is being carried on at this Grass Valley mine. The shaft is 600 ft. and will be carried 200 ft. further.

Golden Eagle—This company, through F. O. Parker, of Los Angeles, has acquired the holdings of J. E. Mitchell, of San Francisco, at Deadman's flat, including the West Point claim. Extensive development is planned.

Polar Star—It is expected that this mine, at Grass Valley, will be started up soon.

Placer County

Good Friday—The men operating this mine, at Ophir, have struck a good vein.

Sierra Development and Mining Company—This company is extending the old Ralston ditch to the Meadows and will put in a dam at that point.

Plumas County

French Ravine—This company has been organized to develop the old Shenandoah mine in French ravine, near Rich bar.

San Luis Obispo County

La Cuesta—A contract has been made for a 10-stamp mill for this company, at the Chorro, north of San Luis Obispo.

Trinity County

Birdie M.—H. S. Nonemaker, owner of this claim at New River, near Quimby, has just finished a crushing which averaged $10 per ton, in the Huntington mill.

Shasta County

First National Copper—Following a conference of the San Francisco attorneys of the company with Judge Morrow, of the Circuit Court, the farmers have agreed to a final hearing regarding the fume situation at the Balaklala. Unless there is a change in the farmers' attitude the smeltery must close. The First National wishes to keep one furnace running

in order that the working force may not be disintegrated. One furnace was shut down July 26.

TUOLUMNE COUNTY

United Mines Corporation—This company, owning the Eureka, Dead Horse, Lady Washington, and other mines near Tuolumne, has issued a deed of trust to the Cleveland Trust Company, as security for an issue of $250,000 bonds. The floating debt will now be taken up and improvements and developments made.

Colorado

HINSDALE COUNTY

Indiana-Colorado—This new 50-ton mill will handle ore from the California and Lightning Striker mines.

Pelican—This mine, 1½ miles from Lake City, is employing 40 men in development. Extensive repairs have been made.

Yellow Medicine—This mine, near Capital City, has been sold to a company organized at Hamilton, Ont. It will be developed.

Chicago—This crosscut tunnel, near Rose's Cabin claims, is being advanced to the Horseshoe basin.

Dolly Varden—Work is being done on this group, near the Rose's Cabin claims.

Frank Hough—This property, on Engineer mountain, is shipping to Durango, about 10 tons daily.

LAKE COUNTY—LEADVILLE

Cleveland—The drift started several weeks ago from the bottom of this South Evans mine, to open the vein at a depth of 800 ft. and in the granite, has reached its objective point, the vein as exposed being strong and well defined, the values being the same as in the porphyry.

Clear Grit—The machinery is installed on this property, in Iowa gulch, and the gallows frame is being erected. The shaft has been sunk to 40 ft. C. J. Moore is manager.

Black Prince—John Certillini and associates have men at work preparing this property for active prospecting in the near future.

Dolomite—The old shaft on this property, in Adelaide park, is being retimbered preparatory to sinking. This mine and adjacent properties have been acquired by a new company called the Breece Hill Mining and Development Company, S. B. Fenton, manager. The results of core-drilling operations were very encouraging and the company will conduct vigorous development.

TELLER COUNTY—CRIPPLE CREEK

El Paso—Lessees operating block 28 through the Standard tunnel report a strike of sylvanite ore carrying 2 to 10 oz. gold per ton. The strike is in Little May ground, and about 650 ft. below the surface.

Stratton Estate—Lessees operating through the Lucky Gus No. 2 shaft have opened a new oreshoot in the Lucky Gus vein, the ore assaying from $20 to $200 per ton.

Victor—It is reported that the Golden Cycle Company is to treat at its Colorado City mill 1000 tons of the dump of this old time producer. The rock yields $10 per ton on assay, it is claimed.

SAN JUAN DISTRICT

Tiger—This mine in the eastern gold belt of San Juan county has made a strike in level "D." The Iowa Tiger mine is leased to the Iowa Tiger Leasing Company. For the past 18 months the company has been mining a galena ore without any knowledge of gold values alongside. Prospecting the hanging-wall disclosed stringers with free gold. Twenty-eight hundred pounds have been shipped to Silverton the first assay of which ran 62 oz. gold.

Idaho

COEUR D'ALENE DISTRICT

Morning—The drift on the lowest level shows a galena orebody 5 ft. wide and proved for 40 feet.

Stewart—The mine is shipping 250 tons of ore daily to Wallace. A shaft has been begun in the lower tunnel and will be sunk 200 feet.

Marsh—The oreshoot has been proved in the intermediate level for 350 ft. When the concentrator is erected, which the company figures will be soon, shipments will start. It is a lead-silver property.

Missoula Copper—The west drift has struck copper ore which has widened to 6 ft. The ore is mixed shipping and milling grade with about 2 ft. of the better ore.

Coeur d'Alene Mining Company—The New England Exploration Company of Boston, has been testing the 2000 acres of placer owned by the company. The bedrock is from 15 to 30 ft. below the surface and is of a nature that ordinary dredging machinery will not handle. Considerable tunnel work has been done by Robert E. Cranston of Sacramento, Cal., and it hoped that an economical way can be found to work the placers. The ground has never been worked.

Alice—The mill has been closed and development is expected to cease soon. The Alice has been shipping lead-silver ore and concentrates since early this year. No reason is given out by the management for this action.

Indiana

GIBSON COUNTY

The week in the Oakland City oilfield has been below the average with three wells completed and an estimate daily increase in production of 400 bbl. The heaviest sand in the history of the field was drilled by the Shoup Oil Company, on the Coleman farm, the thickness being 61 ft. The well stopped in sand. The Ohio Oil Company has four crews at work on the pipe line from this field to Bridgeport, Ill. The line will cross the White and Wabash rivers, near Decker, Ind. Six-inch mains are being laid.

KNOX COUNTY

Two hundred cans of powder stored in a magazine of the Freeman coal mine, near Bicknell, exploded July 23. A miner went to the magazine for a supply of gasolene and had not extinguished the torch on his hat. In some manner he allowed the gasolene to come in contact with the torch. Realizing the danger, he hastily retreated from the magazine. He had run about 300 ft. when the powder exploded; he was thrown to the ground, painfully burned by the gasolene, but otherwise uninjured. A big hole was torn in the ground and practically all the windows in the business district of the city were broken. The Freeman mine is located at the edge of the town. None of its property except the magazine and contents was destroyed.

VIGO COUNTY

Fire, thought to have originated from a spark dropping on the roof of a boiler shed, July 23, destroyed the top machinery, boiler and engine house of the Hocking mine, near Farmersburg, owned by the Alliance Coal Company.

WARRICK COUNTY

Big Four Coal Mining Company—This company, with offices at Booneville, is erecting a new tipple at its mine, east of Booneville. Coal at this mine is hauled half a mile on a small track to the Southern Indiana railroad and dumped into cars.

Kansas

Boston Land and Mining—This company has bought the steam shovel of the Continental Zinc Company and will use it in its opencut mine, at Galena.

Peacock Valley—This company, at Peacock has worked out most of the pillars of the Peacock mine and caved the ground and will now run the ore from the cave. The ore in the upper levels could not be worked on account of the poor roof in the lower level.

Michigan

COPPER

Seneca—The shaft is bottomed at the fifth level, 920 ft. from surface, where a station is being cut preparatory to crosscutting to the Kearsarge lode. At the south drift from the third level an improvement has been noted in the ground.

New Baltic—The shaft is in the footwall 40 ft. behind the lode. The first level will be at 150 feet.

Keweenaw—The shaft on the Kear-

sarge lode is down 300 ft. and has again entered the copper-bearing formation, which it passed out of at 100 feet.

New Arcadian—This mine has started trenching where a drill core recently exposed a copper-bearing amygdaloid at a shallow depth.

Cherokee—The No. 1 drill hole has been discontinued after driving into the sandstone and has been moved to the No. 3 hole. No. 2 hole continues sinking without results.

Gratiot—This company is shipping about 300 tons of rock daily to the Allouez-Centennial mill, from the stock piles.

Lake—Under the new management this company is limiting its rock shipment to that which is taken out in development, and as a result but one shipment consisting of 450 tons has been made this month.

Iron

The Jones furnace, at Iron Mountain, will start soon, Elmer Jones is in Pittsburg making a test run at the Carnegie Institute.

Hartford—The Republic Iron and Steel company is making preparations to resume operations at the mine closed since June 1, when the Oliver company surrendered its lease, after operating the property for ten years.

Minnesota

Morton—The concrete shaft being sunk for this mine of the Tod-Stambaugh Company, has not yet reached bedrock. This shaft when finished will have penetrated 186 ft. of quicksand and gravel overburden, of which 174 ft. was sunk by dredging in water, the shaft sinking of its own weight. When this depth was reached additional headway could not be made due to the side friction of quicksand. Pumping under a pressure of 42 to 48 lb. per sq.in. was then tried but failed to work out successfully. Work has now been started toward excavating under the cutting shoe and suddenly lowering air pressure from 42 to 30 ft. per sq.in. which will be equivalent to adding some 1400 tons weight. The sandhogs are now working two 1-hour shifts out of each 24 hours. It will be remembered that for eight months this shaft has lacked but 12 ft. of reaching bedrock.

Laura—The timber shaft of this Mine of the Inland Steel Company, which was destroyed by fire May 30, has been cleared out and retimbered. This shaft will be put into commission again soon.

Susquehanna—The machine shops of the Drake & Stratton Company will soon have to be moved due to the stripping operations of the Winston-Dear Company for this Buffalo and Susquehanna mine. As soon as a new location is secured permanent shops will be erected by Drake & Stratton.

Missouri

A zinc discovery in Vernon county, near Dedrick, is reported. Eleven ft. of ore was struck at 130 ft. in an oil hole.

Joplin Lead and Zinc District

Federated—This company attempted to introduce Italian labor in its mine, but the foreign labor was not allowed to remain by the American miners.

American—The company has been forced to close its mines on account of a strike of its miners, who wanted an increase.

Quick Seven—This camp, at Neck City, is making a weekly output of 250 tons.

Little Mary—The company has nearly completed its 250-ton mill, near the Quick Seven, at Neck City.

Plata—The mine at Spring City has been bought by Kaufman and Patterson, of Amarilla, Tex., and the mine will be opened up at once.

Microbe—This mine, at Spring City, has changed hands and the mill is being remodeled and a new shaft sunk preparatory to starting.

Montana

Butte District

Anaconda—The Washoe sampling works, in Butte, was burned July 15; the loss is estimated at $75,000. The mill was built by Taylor & Brunton in 1904, and has since been used to sample custom ores sent from Butte for treatment at the Washoe smeltery.

Raven—Stockholders have recently received notice that a payment of 10c. per share will be due on all stock Aug. 1. When the company was reorganized some time ago the old stock was given a valuation of 25c. per share, thus making 75c. due on the new stock. Twenty-five cents was paid at that time and the balance of 50c. was made subject to the call of directors.

Fergus County

Barnes-King—The management states that no definite decision has been made to shut down the property permanently but that it has been decided that the mill cannot be run profitably and that operations will be discontinued. There is at present about $250,000 in the treasury but it is not probable that any part of this will be expended in further prospecting.

Granite County

In the Georgetown district, Bob Lindberg and Joe Anderson are leasing on the Holdfast claim and at 5 ft. have cut a 7-ft. vein containing gold quartz thought to be a continuation of the Oro Fino vein. James Drumgoole's Trilby claim near the Holdfast is developing.

Lincoln County

Operations have begun at the Silver Cable mine south of Libby and it is expected that the vein will be cut within a few days. At the Shaughnessy Hill mine more than a car of ore has been sacked. A deal is pending for this property.

Madison County

In the Summit district, Charles Ryden, working the Atlas Extension, struck a rich vein and has again encountered the same vein in a shaft 300 ft. south of the other strike. The ore is 6 ft. wide. Ball & Tullock have recently made several shipments from their Wanetaka mine near Virginia City. The vein is 6 ft. wide. The Butte-Alder Gulch company operating the Nelly Bly has cut a 7-ft. orebody and is making arrangements for a 10-stamp mine. At the Homestake mine, Thompson & Bariter have made a car shipment. At the Apex mine on the 310-ft. level the vein is from 8 to 12 ft. wide and is high-grade milling ore. Ore is being blocked out awaiting the mill.

Missoula County

Iron Mountain—A new silver-lead outcrop recently discovered near the top of the mountain is 3 ft. wide. The ore can be tapped by extending the tunnel on the 1600-ft. level 500 feet.

Monitor—This development company has acquired the lease and bond on the Monitor copper property, formerly held by the Success Mining Company. The bonding concern will continue the drifting on the 400- and 700-ft. levels.

Nevada

Esmeralda County

Goldfield Consolidated—Work on the fifth surface exit for Consolidated ores is being rushed. The Laguna shaft has been sunk to the 600-ft. level, at which point a crosscut is being driven south to connect with the Clermont north drift. Raises at intervals will tap the ore on the 360-ft. level of the Red Top workings, affording means for economical extraction. A new gallows frame and new ore bins are under course of construction at the shaft and should be completed within a month.

Woodruff-Goldfield—A daily flow of 20,000 gal. of water has developed and is being handled by a steam pumping plant.

C. O. D.—The Victor shaft has been retimbered and stations cut at the 400- and 450-ft. levels preparatory to active development.

Gold Bar—Specifications are complete for a 50-ton reduction plant. No stamps are to be used. Treatment in a rotary crusher and Denver quartz mill will be followed by amalgamation and jigging to effect saving of base metals. This treatment is an innovation but tests show good results.

Goldfield-Jupiter—D. MacKenzie has brought suit for the company against the Goldfield Consolidated to recover $5000

for alleged damage to the property lying directly north of the tailings pond where the slime from the big mill is dumped.

HUMBOLDT COUNTY

Many mining men have visited the new district of Red Butte, and from indications there will be much development there this fall. The district has some gold, but is principally a large copper camp, sulphides having been found in large bodies on the surface.

Stall Brothers—This lease, at National, shipped recently gold bullion valued at $85,000. The shaft is down 400 ft., and much of the ore runs from $20 to $100 per pound. One day this lease took out $20,000.

National—This property, at National, expects soon to install a Lane mill to handle the low-grade ore.

LANDER COUNTY

Kimberly—This company has been reorganized, and Samuel Wheeler, of Reno, is now interested; the company has resumed.

NYE COUNTY

Tonopah-Belmont—Hoist and compressor foundations are in and await the arrival of the machinery. The widened shaft is now within 300 ft. of the surface, progressing at the rate of 45 ft. weekly.

Tonopah—The work is chiefly confined to prospecting and developing above the 700-ft. level. The Sand Grass claim, the most westerly ground owned by the company, will soon be the scene of active development, through the new shaft which is now at 390 feet.

Montana-Tonopah—Three feet of high grade has been encountered on the 765-ft. level near the North Star property. The mill report shows 90.9 per cent. extraction on 749 tons of ore.

Bullfrog Pioneer—Operations for June show 626 tons milled, with $25 per ton recovered on the plates and an additional extraction from cyaniding the tailings.

Eclipse Development—Two sub-leases have been let, the company giving favorable terms for handling the output in its mill.

Montgomery-Shoshone—Official report for April shows receipts amounting to $25,505; expenses, $23,200; net, $2304. Bills payable, including loans and interest to date, $219,884.

WHITE PINE COUNTY

Nevada Consolidated—Preliminary steps are being taken toward shipment from the new steam-shovel pit known as the "Liberty." The mouth of this pit is 3000 ft. southwesterly from the mouth of the Eureka pit from which the large tonnage is being taken, and from this point will be extended southerly for several hundred feet and thence easterly which last direction will take it toward the head of the Eureka pit which it will probably join. The mouth of the Liberty pit is in a gulch and tracks have been laid to it along the hillside on each side. The overburden is from 20 to 100 ft. in depth and is of irregular contour which will result in difficulty of handling. It is probable that about the same quantity of carbonate ore will be encountered here as in the Eureka pit. The steam shovels for this work are delayed and will not arrive until fall.

Ely Centennial—A fund of $15,000 has been provided to acquire additional ground adjoining this property, in the eastern part of the Ely district. Samuel Newhouse and John Dern are interested.

Ohana—This company, in the Blackhorse district, is planning to install a 20-stamp mill. A. G. Burritt is president.

New Mexico

GRANT COUNTY

Mangas—This development company has drills at work in Emerald gulch and at Midway. H. A. Link is superintendent.

Chino—Seven drills are working on ore-bearing ground and two are drilling for water. The deep-rigged drill at work in the Carasco section, has encountered average-grade ore at 1300 ft. In all probability when the productive stage is reached, operations will be begun on the steam-shovel orebodies.

Oregon

BAKER COUNTY

Queen of the West—This mine is operating a 10-stamp mill, and some of the ore is averaging $110 per ton. The installation of a cyanide plant is being considered. F. J. Eitel is in charge.

Oro Fino—This group has been leased to D. L. Killgore, I. J. Leach and J. A. Dygert. A 125-ft. adit will be driven.

Pennsylvania

Pittsburg Coal Company—The financial report for the half year ended June 30 shows net earnings of $1,704,602, an increase of $739,918 over 1909. Charges were: Depreciation of coal lands, $353,523; depreciation of plant, $450,545; interest, $494,926; total, $1,298,994, leaving a surplus of $405,608, which compares with a deficit of $265,996 for the first half of last year.

Tennessee

A. J. Robertson, manager of the Meridian Fertilizer Company's phosphate rock mines near Centerville, has received orders to resume mining Aug. 1. The mines have been closed for two years. About 100 men will be employed. Only one other mine has been in operation regularly since 1907. The survey is under way from Goodrich to the 3000-acre phosphate field on Jerry's Branch, owned by Mayor J. B. Walker, of Centerville. One of the largest companies in the phosphate business has an option on this property. It is only a few miles from Goodrich to Jerry's Branch, and a branch will doubtless be extended there and probably on to Little Lot, as it would traverse a section rich in iron and phosphate ores.

Tennessee Copper—The second unit of the acid plant, is practically completed and part has been placed in operation. The new plant will be gradually brought up to capacity, and it is expected that by Fall it will be turning out acid at the rate of 250,000 tons annually.

Texas

A cargo analysis of the first shipments of iron ore from east Texas to Philadelphia shows: Moisture, 3.438 per cent.; metallic iron 57.450; silica, 4.800; alumina, 0.942; manganese, 0.314; sulphur, 0.116; phosphorus, 0.118 per cent.

Utah

BEAVER COUNTY

South Utah—A new smelting contract has been made with the International company, and shipments will be called for in the fall when the smeltery is under full headway. Arrangements are being made for better freight rates. The company has a 1000-ton mill, which has been overhauled and new equipment added. Heretofore the plant treated 800 tons daily, and made a saving of a little above 50 per cent. Tests with the new milling arrangements indicate that an extraction of about 75 per cent. can be made. In addition to the concentrates there is at present a limited amount of ore developed which can be shipped direct. Between 80 and 90 men are employed on development and other work. There is said to be about $250,000 in the treasury for working capital.

Horn Silver—Four new drills are being used in raising.

Cedar Talisman—The raise from the 500-ft. level is still in ore. There are good showings on the 125- and 500-ft. levels. Two cars of ore are being loaded.

JUAB COUNTY

Chief Consolidated—During June 783 tons of ore were produced, on which the returns are given as $22,907. Ore has been opened on the 1400 level, 300 ft. north of where it was originally encountered. The June product came from orebodies about 150 ft. south of this point.

Iron Blossom—The No. 1 shaft is down 1700 ft., and a station is being cut to open a new level. The station will be made large enough to install a donkey engine, which will be used for sinking to the 2000-ft. point. Levels will be driven at the 1800-, 1900- and 2000-ft. points. Shipments are being made from both shafts, which include a car per week from the gold ore recently encountered. The 500-ft. level is in low-grade ore south

of the shaft. Work is being continued here to develop the ore of a better quality encountered in the upper workings.

Tintic Standard—A report giving notification of assessment No. 2, and stating why this is necessary has been sent to stockholders. The indebtedness, July 1, was $11,692. There are 70,000 shares of stock in the treasury. The company owns 10 lode claims, which are fully paid for. A total 4372 ft. of development has been done. The shaft is down 885 ft., and will be sunk to the 1000-ft. level, from which point crosscuts will be run to develop known mineralized fissures. The assessment is 1c. a share.

Mammoth—The damage caused by the dropping of the cage to the bottom of the shaft is not great. A new shafthouse and headframe will be necessary, also a new drum for the hoist and a 2000-ft. cable. The timbering in the shaft will be repaired. A small hoist is being installed on the tunnel level to keep the mine going.

Yankee Consolidated—There were 1205 shares of stock delinquent at the sale July 14. The new electric hoist has been placed in position.

Dragon Iron—The shaft is being sunk, and this has caused some reduction in the shipments.

Colorado—It is the intention to fully explore and develop the 500-ft. level before sinking further. The drift east of the shaft is being extended.

Clift—Ore running 30 per cent. lead and 12 to 15 oz. in silver is being mined from a raise above the tunnel level. A 4-ft. face is exposed. The mine is near Silver City.

East Tintic Development—Leasers are operating jigs, and producing lead ore of good grade. Two cars have been shipped.

McKinley—This property in north Tintic was recently closed down to avoid levying another assessment. The stockholders are nearly all working men. The company is free from debt, and will resume later.

Schwab—This company, which owns claims in east Tintic, is suing the Iron Hat Mining Company to recover certain parts of the Agnes Nos. 1, 2 and 4, and Junior Nos. 1, 4, 5 and claims, which it charges the Iron Hat company of including in its survey of claims, on which it is applying for patents.

Victoria—The object of the meeting August 1 is to ratify the purchase of claims owned by the Snow Flake Mining Company. The purchase price is given as $40,000, or at the rate of 13½c. per share for the outstanding Snow Flake stock. The claims adjoin the Victoria ground, and can be developed from its workings at depth.

SUMMIT COUNTY

New York—Assessment No. 23 of 2c. a share was levied July 14. The fissure recently cut on the 800-ft. level has been drifted on to the east 100 ft., ore occurring all the way, but not of shipping quality. There are between 2 and 3 ft. of iron-stained quartz in which occur bunches of ore with silver.

Silver King Coalition—A number of changes have been made in the working force since George D. Blood became superintendent. This applies particularly to the shift bosses. A new orebody of large extent is reported to be under development on the 1300-ft. level.

Daly-West—During May, the earnings were approximately $28,000, which is above the dividend requirements of $18,000 per month. It is understood that net profits for June will be somewhat less, owing to an unusual amount of surface water having entered the upper workings. New bodies of milling ore have been opened recently on the 17th, 18th, 19th and 21st levels. With the last quarterly dividend paid July 20, the Daly-West will have distributed $6,281,000.

Red Warrior—Copper is reported in the lowest workings. Up to the present, the ores have carried silver, lead and gold.

Washington

FERRY COUNTY

Trojan—Development at this property is progressing and the company is in the market for a diamond-drill outfit.

Globe—Officers of this company recently made an inspection of the mine, and development will be continued. The company is owned by Hamilton, Ont., capitalists.

SNOHOMISH COUNTY

Washington & Iowa Copper—This company has done 2000 ft. of development on its claims, near Index. G. A. Rinehart, E. P. Hewitt and N. B. Evans are interested.

Canada

ALBERTA

German Development Company—Development of this company's Brazeau coal measures has been commenced. The area held is 4 sq.m. James McEvoy, Dominion geologist, estimates total coal contents at 198,000,000 tons. The field is 150 miles west of Edmonton. Three other coal areas held are: Bighorn, area 5 sq.m., estimated coal content, 124,000,000 tons; Kananaskis, area, 5040 acres, estimated coal, 520,000,000 tons; Saskatchewan, area 320 acres, estimated coal, 5,000,000 tons. The coal is of excellent quality, for steam and domestic uses.

BRITISH COLUMBIA

Doctor Brock, director of the Geological Survey, says regarding the Stewart River, B. C., district: "I think it safe to say that while it is not yet a proved or established mining camp, it is the most promising district opened up in British Columbia since the boom of a decade ago in the southern part of the province."

Hedley—The equipment for generating electric power is being added to. Included in the new plant is a 600-h.p. Doble impulse waterwheel, with special needle nozzle and auxiliary relief, to be direct connected to a 350-kw. generator, for supplying water to both mines and stamp mill.

Le Roi—This mine, at Rossland, is to be closed; diamond drilling in bottom levels has not proved occurrence of pay ore in considerable quantity. There are large orebodies, but grade is too low for profitable working under existing conditions. A. J. McMillan, managing director, has gone to England to confer with his codirectors as to future operations.

Iron Mask—A new concentrator is being erected at this mine, five miles southwest of Kamloops, and formerly operated by the Kamloops Mines, Ltd. The occurrence is a sheared zone, mineralized for approximately 100 ft. of its width, much faulted and broken, estimated to have an average copper content of three per cent.

Canadian Klondike—This company is shipping material for a large gold dredge to be used on Bear creek, at the muoth of the Klondike river.

Princeton Coal and Land Company—This Vancouver company has decided to spend a large sum in improvements, including a compressor plant.

Velvet-Portland—This mine has again been leased to Edward Ehrenburg, of Spokane. Work will be started at once.

McLeod—This group, in the Portland canal district, has been sold to a Nelson company, including J. B. Tierney. Work will be started immediately.

Yukon District—This gold mining company, operating in the Windy Arm district, is making regular shipments, the last shipment of 62 tons, averaging $89 per ton. J. H. Conrad is superintendent.

NOVA SCOTIA

Nova Scotia Steel and Coal Company—It is announced that a syndicate, headed by President Robert Harris, has bought some 21,000 shares of stock which were owned by Rudolphe Forget, of Quebec, and associates. This removes the opposition party, which has made some trouble for the management.

American—This gold mine, at Montague has struck rich gold-bearing quartz at 80 ft. S. A. Hiselor is manager.

ONTARIO

Cobalt ore shipments for the week ended July 15 were as follows: Buffalo, 54,000 lb.; Chambers-Ferland, 64,000; Cobalt Townsite, 48,860; Crown Reserve, 64,000; Hargraves, 41,370; Kerr Lake, 300,000; La Rose, 152,000; McKinley-Darragh 95,980; Nipissing, 239,090; total, 1,059,300 pounds.

There has been considerable develop-

ment in the Smoothwater section and a large number of claims showing silver have been staked this season. About 100 claims have lately been restaked.

Gould Consolidated — Underground work has been stopped and a diamond drill is being used.

Trethewey—Two more veins have been found in a crosscut from the No. 2 shaft.

Crown Reserve—An important strike was made July 21. A vein 6 in. wide was encountered, carrying 3000 oz. silver to the ton, about 900 ft. down the lake and a similar distance from the nearest point at which pay ore has been worked.

Nipissing—A new orebody 15 in. wide, of 1500-oz. ore was found on July 22 in the east crosscut on the 300-ft. level in shaft No. 64.

Dominion Reduction Company—This Cobalt company has decided to erect a 100-ton custom concentrator on Kerr lake to treat low-grade ore. The plant will be on the Crown Reserve property.

Marathon—On this South Lorain property, 1¼ miles north of the main mining area of the camp, a smaltite and niccolite vein from 4 to 8 in. wide has been found on the surface and stripped for 100 feet.

Timmins—The mill at Porcupine was started July 20, running about 5 tons of ore per day. The returns are reported to be over $300 per ton. A 30-stamp mill has been ordered.

Buffalo—The 300-ft. level, which is the deepest working in the conglomerate in the Cobalt camp, has been reached by a winze put down from the 250-ft. level on No. 10 vein. The vein at 300 ft. shows 4 in. running between 2500 and 3000 oz. to the ton. The capacity of the mill has been increased by the addition of eight more sand tables.

Silvers Limited—At a shareholders' meeting of this Gowganda company in Montreal, July 22, it was resolved to close the mine, as there were no prospects of its proving profitable.

Mexico

CHIHUAHUA

Batopilas—The company reports the discovery of gold-bearing veins. Work on the discoveries has been stopped during the wet season as the locality is inaccessible, owing to deep water in the river. Active operations will, however, be taken up soon. The manager is now taking up the plant question with manufacturers.

El Rayo—Developments in the Adela section of the property are promising and from present indications a large orebody will be opened up between raises No. 6 and No. 16, from the Pettit tunnel.

OAXACA

In Taviche production and development are rather quiet although more ore is being sold than ever before. The many failures the camp has to record, due to lack of sufficient capital on the part of the developing companies, and due to incompetency on the part of some of the managers, have made it rather hard to secure funds for opening up the mines. With the San Juan, the San Francisco, the Zapote and others producing regularly and showing good ore at every new level, confidence is bound to return.

It is reported that the prospects for the building of the custom mill at Santa Ines are favorable, the control having passed from Dr. Howard A. Kelly, of Baltimore, into New York hands. A thorough canvass of the ore supplies of the Taviche camp is being made by N. O. S. Ford for the mill company.

In the Totolapam camp repeated finds of high-grade ore are being reported from entirely virgin sections. In San Luis del Rio, Messrs. Brill and McEwen have taken up a prospect showing ore 30 to 40 kg. in silver and 1 oz. in gold per ton on the surface.

San Martin—This mine, in San Martin, about 45 miles south of Oaxaca, is reported to have been purchased by C. A. Barnard and associates, of Montreal, Can., for 500,000 pesos. Henry Domville, of Montreal, has been placed in charge, and has commenced to unwater the mine and clean out the old levels. The property is one of the oldest mines in the State, records of the mine existing as far back as 1750. Until Frank Leonard, of Butte, bought the mine for himself and associates seven years ago, forming the Cia. Minera San Martin y Anexas, work had been carried only to 100 ft. depth. Later the shaft was sunk to 340 ft., and a small mill of six Merrill stamps and three Wilfley tables erected. Owing to lack of capital work was suspended for some time, except stoping some of the rich ore. Deep development is contemplated by the new owners.

Colonial Mines Company—This Boston company in which Jerome Smith, of Boston, is interested, has made the final payment on the San Francisco group of mines in the Sierra Juarez camp, north of Oaxaca. These mines are old, having been worked by the Spaniards. There are many thousand feet of tunnels and crosscuts. The new company has been carrying on exploration work under the supervision of E. E. Chase, of Denver, for the last year and has opened up sufficient ore to warrant the erection of a 50-ton mill. The property was sold by the Rickards Brothers, of Oaxaca, who inherited the mines.

Old Mexico Mining Company—This company, under management of Captain Cummings, has been developing the El Carmen mine in the Sierra Juarez district, and has been able to get a very high and at the same time cheap extraction in its Rescate mill. The process used is crushing in stamps and amalgamating, concentrating and cyaniding concentrates and tails.

Santa Catarina—This group, which includes the Parada de San Ignacio and the La Leona, of the Rickards Brothers, has been taken under option by A. R. Skertchly, for English interests.

Santa Lucia—This mine, beyond Totolapam, in Huitepec, owned by George H. Nobbs and Henry Morton, of Boston, is developing some copper, gold, silver ore in a virgin section.

San Juan—At this mine C. H. Hamilton is planning large surface improvements. It is reported that a $30,000 iron roof has been ordered for roofing over the ore-sorting patio. The patio is going to be extended further down the creek, necessitating the bridging over of a large section of the latter. The entire machinery is being overhauled. Last month the mine was reported to have sold 27 cars of medium-grade ore. The law suit on the mine is still pending, and it is impossible to get correct information as to its present state. Don Juan Baights, Mr. Hamilton's opponent, died in Oaxaca, last week, but the sons are going to continue the fight.

Standard—Funds for resuming the work on this group of copper mines in San Jose have been sent to the local management. It is expected to drive a 1000-ft. tunnel for opening up the 100-ft. vein on the south end of the mines.

Humboldt Mining Company—This new Boston company has been formed to develop copper, silver and lead properties near the railway in Ocotlan, the Humboldt group. These claims adjoin the Treadwell. President is Edward J. Plimpton, of Norwood, Mass., and the treasurer, Albert E. Knowlton, of Boston. The local management will be in charge of Place & Elton, of Oaxaca.

Rhenania—This group of copper, gold, silver prospects, owned formerly by Redick R. Moore, has been acquired by Oaxaca mining people.

SONORA

General Development Company—This Lewisohn concern is developing properties in the Yaqui River region, formerly included within the boundaries of the Ryall concession. A property opened by the Pacific Smelting and Mining Company was taken under bond from that company a few months ago, and before the expiration of the Ryall concession much adjoining mineral land was denounced. The holdings now total over 1200 pertenencias. The price to be paid the Pacific Smelting and Mining Company is approximately $100,000.

Africa

RHODESIA

Gold production in Rhodesia in June is reported at 51,016 oz., being 2403 oz. less than in May. For the half year ended June 30 the total was 300,446 oz. in 1909 and 315,305 oz.—or $6,517,354—in 1910; an increase of 14,859 oz. this year.

THE MARKETS

Current Prices of Metal, Minerals, Coal and Stocks, Conditions and Commercial Statistics

Coal Trade Review

New York, July 27—Coal trade in the East is in fair condition, but not specially active anywhere. Prices generally continue rather low.

In the West the trade is still in an uneasy and disturbed condition, as shown by the strike reports given below. It will take some time yet, apparently, to settle the differences which still exist. Meantime the larger consuming centers are beginning to feel some shortage of supplies. Orders from the West are coming to several districts in Pennsylvania, which usually ship to tidewater; and West Virginia coal is finding new markets.

It is reported that the Bethlehem Steel Company has concluded a 20-year contract with the Davis Coal and Coke Company to supply the coal for the by-product coke plant now under construction at Bethlehem. The contract, it is said, is for a quantity not less than 750,000 tons, and not to exceed 2,000,000 tons yearly.

Strike Conditions—The coal-mine operators of Illinois have left Indianapolis for their homes and the hearing before the international executive board of the United Mine Workers of America, which has been in progress for a week, came to an abrupt end, without any definite decision having been reached. While the members of the executive board will give out nothing for publication, it is understood that argument has been heard from both Illinois miners and operators, and that there is a strong sentiment against supporting a strike in that territory.

The continued failure on the part of the Illinois miners to come to a settlement of their present difficulties with the operators of their State has had a disquieting influence. In several different States the men are in conference with the operators on the question of a new contract. According to President Lewis, 95,000 miners, approximately, are on strike in Pennsylvania, Ohio, Illinois, Oklahoma, Missouri, Kansas and Colorado, while 10,000 are threatening to go out in Wyoming on Sept. 1, and 5000 in Washington are making the same threat. In all these States there is no apparent chance for an immediate settlement of the differences, and, in many of them, it is apparent that unless President Lewis intervenes at once negotiations will be broken off.

A late despatch reports that on July 26 an agreement was reached in the latest Illinois conference. Under its terms the Illinois Coal Operators' Association will pay the advance of 3c. a ton mine-run and an additional 2c. a ton in Franklin and Williamson counties. Other conditions are not given. The agreement will have to be submitted to a vote of the miners.

Coal Traffic Notes

Coal and coke tonnage originating on all lines of the Pennsylvania Railroad Company east of Pittsburg and Erie, six months ended June 30, short tons:

	1909.	1910.	Changes.
Anthracite	5,782,490	5,767,761	D. 15,029
Bituminous	18,080,767	20,218,095	I. 2,137,328
Coke	5,048,278	7,270,683	I. 2,222,405
Total	28,911,835	33,256,539	I. 4,344,704

The total increase this year was 15 per cent.

The Pittsburg Coal Company reports production as below for the half year ended June 30, in short tons:

	1909.	1910.	Changes.
Pittsburg district.	5,272,790	6,599,939	I. 1,327,149
Ohio district	316,426	524,667	I. 208,241
Total coal	5,589,216	7,124,606	I. 1,535,390
Coke made	214,174	300,311	I. 86,137

Increase in coal this year, 23.7 per cent.; in coke, 40.3 per cent.

Coal shipments over the Norfolk & Western railway for the fiscal year ended June 30, short tons:

District:	Commercial.	Company.	Total.
Pocahontas	9,645,908	1,181,792	10,827,700
Tug River	1,459,504	263,730	1,723,234
Thacker	1,487,513	678,387	2,165,900
Kenova	659,180	184,835	844,015
Clinch Valley	680,732	57,218	737,950
Total	13,932,837	2,365,962	16,298,799

The total increase for the year over 1908-9 was 3,628,424 tons, or 28.6 per cent.

Bituminous coal and coke tonnage of leading railroads in Pennsylvania and West Virginia, five months ended May 31, short tons:

	Bituminous.	Coke.	Total.
Pennsylvania	16,930,680	6,205,506	23,136,186
Balt. & Ohio	11,212,750	1,894,913	13,107,663
Buff., Roch. & Pitts.	2,855,569	255,142	3,110,711
Buff. & Susquehanna	494,674	104,629	599,303
Penn. lines, N. Y. C.	3,384,018	19,392	3,403,410
Pitts. & L. Erie	3,766,264	2,960,077	6,726,341
Pitts., Shawmut & N.	451,126	9,890	461,016
Norfolk & Western	6,924,604	1,319,073	8,243,677
Ches. & Ohio	6,523,936	204,388	6,728,324
Virginian	284,741	.....	284,741
Total	52,828,362	12,973,010	65,801,372
Total, 1908	42,588,312	9,078,978	51,667,290

Total increase this year, 14,134,082 tons, or 27.4 per cent. Virginian railway tonnages are tidewater coal only. Anthracite tonnages of Pennsylvania and Baltimore & Ohio are given elsewhere.

Anthracite carried by Baltimore & Ohio Railroad, five months ended May 31, was 379,494 tons in 1909, and 402,184 in 1910; increase, 22,690 tons.

Bituminous-coal shipments over the railroads in the Ohio Coal Traffic Association for the five months ended May 31 were 5,468,729 short tons in 1909 and 7,992,997 in 1910; increase, 2,524,268 tons, or 46.2 per cent. Figures by roads for May are not yet available.

New York

Anthracite

July 25—There is a little spurt of buying to save the 10c. which will come of the summer discounts on prepared sizes on Aug. 1. Otherwise, trade is quiet.

Schedule prices of large sizes are $4.55 for broken and $4.80 for egg, stove and chestnut, all f.o.b. New York harbor points. For steam sizes, current quotations are: Pea, $2.95@3.25; buckwheat, $2.15@2.50; No. 2 buckwheat, or rice, $1.65@2; barley, $1.35@1.50; all according to quality, f.o.b. New York harbor.

Bituminous

More business is being done and sales are increasing as the month closes; but a drop is expected in August. This applies to Eastern and general trade. New York harbor trade and barge deliveries are dull.

Gas coal is in good demand and sells at prices equivalent to 95c.@$1 at mine for ¾-in., 85c. for run-of-mine, and 60c. for slack. Good Miller vein steam coal brings about $1.25 at mine and prices run up to $1.45 for George's Creek. Lower-grade steam coal can be had at 95c.@$1 at mine and some demurrage coal has been sold at a price which netted 80c. at mine.

Car supply is good. Transportation is slow, coal taking 7 to 10 days, in some cases 14 days, to come through to tide. The mines are actively at work as a rule, the West taking a good deal of coal from mines which usually ship to tidewater.

In the coastwise trade more vessels are to be had and rates are consequently lower. From Philadelphia large boats get 80@90c. to Boston, Salem and Portland. For New York small boats can be had at 50@60c. to points around Cape Cod.

Birmingham

July 25—There is no end to the activity in coal in the Southern territory and the production is larger than it has been at any time this year. Recently some handsome orders were received for coal

for use during the next eight months by some of the big railroad systems. Then New Orleans and Louisiana orders of some consequence have been received recently and the coal operators are certain of steady work through the balance of the year.

There is a steady demand for coke and the production is being increased right along.

Chicago

July 26—The coal market continues firm for both Western and Eastern coals, with prices about the same and the demand large for current needs. Hardly anybody is buying coal for storage purposes, at present prices and conditions of production, and the summer requirements of steam plants are being met as in previous weeks very largely from the Indiana mines. Eastern coals have their partizans among users, but their price puts them virtually out of competition with the Indiana or Illinois product when either or both can be obtained. And the summer is not yet far enough advanced for buyers as a class to become uneasy over a possible shortage in the autumn months. To all appearances the current needs of this market could be supplied until coal weather from sources of supply now regularly sending their coal to Chicago.

Screenings continue to be the favorite size of Indiana coal, car lots bringing $1.95@2.15. Run-of-mine sells for $1.90 @2.05, and lump, the sale of which is improving, $2@2.15. Some interest is becoming manifested in domestic coals for early autumn delivery, but it is more in the nature of inquiry than of actual demand.

Eastern coals bring about the same prices as last week, smokeless lump selling at $3.55 and run-of-mine at $3.15, list prices, and Hocking holding closely to the $3.15 list price. The demand for Eastern coals is well met by shipments and there is no surplus coal of any kind on the tracks. Anthracite sales light and scattering.

Cleveland

July 25—Lake trade is improving. There is a good supply of boats and coal is coming to the ports freely. Local trade is quiet, depending mainly on the regular contract deliveries; no new business.

Prices are firm and unchanged. Middle district coal, f.o.b. Cleveland, is $2.15 for 1¼-in.; $1.90 for ¾-in.; $1.80 for run-of-mine and $1.55@1.65 for slack. No. 8 and Cambridge district 5 or 10c. higher. Other sorts unchanged.

Indianapolis

July 25—The returns of the referendum vote of the miners of District No. 11, the bituminous field in Indiana, on the question of accepting or rejecting the proposed fining clause are almost complete and have been received at district headquarters. The official count began today. Acording to leading members of the mineworkers it is conceded that the fining clause as agreed upon at Terre Haute conference will be accepted by a good majority. This will relieve the Indiana situation for the next two years.

Pittsburg

July 26—Demand for coal continues fairly good, helped to an extent by strikes in other districts. Reports are that more miners are at work in the Greensburg field and that the strike there may be settled shortly. The Lake trade is holding up well, although the pressure is perhaps not as great as was expected. There is only occasional shading of prices and we continue to quote the market at $1.20@1.25 for mine-run and nut, $1.30 @1.35 for ¾-in., $1.50 for domestic 1¼-in. and 70@80c. for slack.

Connellsville Coke—The market is very quiet, but steady, and in better position statistically than before July 1. Since the sharp demand for prompt furnace coke which arose at that time there has been little if any good-grade coke on cars pressing for sale, and altogether, although production is as heavy as in May and June while general consumption of coke is less, the Connellsville position is steady, presumably because, as usual when Connellsville coke is cheap, some consumers have changed from other grades to Connellsville. We note two sales of prompt furnace coke in the past week at $1.70, one of 1500 tons and the other of 50 cars. Foundries are slow in closing and the Standard Sanitary business, the largest under negotiation, hangs fire. A small contract for the twelve-month has been put through at $2.25. We quote standard grades per net ton: Prompt furnace, $1.65@1.70; contract furnace (nominal) $1.75@1.85; prompt foundry, $2.10@2.25; contract foundry, $2.25@2.50 at ovens.

The *Courier* reports the production in the Connellsville and lower Connellsville region in the week ended July 16 at 404,543 tons, and shipments at 4020 cars to Pittsburg, 5627 cars to points west and 898 cars to points east, a total of 10,545 cars.

St. Louis

July 25—A decidedly firmer tone has been noticed in the coal market during the past two days. While prices remain practically unchanged, everyone seems to be sold up on all sizes and coal is hard to get.

The Carterville and Springfield district operators and miners are having another meeting to try to settle the strike; however, reports indicate that very little progress is being made. Even should a settlement be effected, it will take two weeks at least for the Carterville district to get running. The district called out the engineers, and owners have been forced to take care of the mines as best they could; consequently this prohibited any improvements and the mines are not up to the requirements of the new State law. For this reason it will be some time before they can pass the State inspectors' examination. The railroads are all bare of coal and are buying freely; their stocks are low and they are only getting enough to supply their daily needs. This is practically taking all the coal that is being produced. With all mines that are open running to full capacity, the supply seems to be a trifle behind the demand now; consequently it would take a very small increase in demand to shoot the price up.

Current prices on the St. Louis market are as follows:

Illinois, Standard:	Mine.	St. Louis.
6-in. lump and egg	$1.40	$1.92
2-in. lump and nut	1.05	1.57
Mine-run	1.00	1.52
Screenings	0.95	1.47
Trenton:		
6-in. lump and egg	1.90	2.42
3-in. nut	1.50	2.02
1-in. nut	1.20	1.72
Staunton or Mt. Olive:		
6-in. lump	1.70	2.22
2-in. nut	1.60	2.12
Mine-run	1.50	2.02
Screenings	1.50	2.02
Carterville:		
6-in. lump or egg	1.60	2.27
3-in. nut	1.50	2.17
Mine-run	1.30	1.97
Screenings	1.30	1.97
Pocahontas and New River:		
Lump or egg	1.50	4.00
Mine-run	1.10	3.65
Pennsylvania Anthracite:		
Nut, stove or egg	.....	6.75
Grate	.....	6.50
Arkansas Anthracite:		
Egg or grate	3.35	5.35
Coke:		
Connellsville foundry	.....	5.40
Gas house	.....	4.50
Smithing	.....	4.15

Screenings are in much better shape this week than last. The Chicago market has stiffened up again and is taking all the screenings that will go there on a 90c. rate. This has relieved the St. Louis market of about one-third of the screenings that are being produced in Illinois.

FOREIGN·COAL·TRADE

German Coal Trade—Exports and imports of fuel in German Empire, five months ended May 31, metric tons:

	Exports.	Imports.	Excess.	
Coal	8,894,825	3,951,654	Exp.	4,943,171
Brown coal	25,242	3,046,205	Imp.	3,020,963
Coke	1,610,573	252,825	Exp.	1,357,748
Briquets	713,660	90,874	Exp.	622,786
Total	11,244,300	7,341,558	Exp.	3,902,742
Total, 1909	10,632,557	7,885,937	Exp.	2,746,620

Included in the coke exports this year were 27,219 tons to the United States.

Spanish Imports—Imports of coal into Spain, five months ended May 31, were 901,960 tons, a decrease of 32,948 tons; imports of coke, 104,793, a decrease of 18,266 tons.

IRON·TRADE·REVIEW

New York, July 27—The iron and steel trades generally show very little change from the last report. The reductions in price noted last week were only nominal, really only a recognition of shading that had been going on for weeks.

Pig-iron buying has been slow and only for short deliveries. Most furnaces still hold to higher prices for future deliveries, and buyers do not seem willing to contract on that basis, believing that prices may go lower still. At any rate, they are willing to take the chances.

In finished material there has not been much new business outside of structural steel. Many small orders for buildings and bridges are coming in, and they make up a pretty good total. The mills are keeping up to about the same load as for two months past, but hardly increasing their tonnage.

Export business is reported pretty good, especially in rails and structural steel.

An important order, for which American, German and British mills will compete, is that for the steel for the Quebec bridge. The bids will be in about Sept. 1 and it is understood that there will be a sharp competition for the contract. About 65,000 tons of steel will be required; the bulk of the order and the special requirements for the steel have aroused much interest.

United States Steel Corporation—The statement for the quarter ended June 30, made public today, is as follows:

Net Earnings:	1909.	1910.
April	$ 8,163,244	$13,414,956
May	9,661,228	13,229,289
June	11,516,019	13,526,715
Total net, 3 mos.	$29,340,491	$40,170,960
Depreciation, replacement, etc.		$6,290,205
Interest and sinking funds		7,311,962
Total charges		$13,602,167
Surplus		$26,569,793
Dividends		$12,658,700
New property and additions		7,500,000
Total appropriations		$20,158,700
Undivided balance		$ 6,411,393

Dividends were 1¾ per cent. on preferred and 1¼ on common stock. For the half year ended June 30 the net earnings were $77,787,736, or $25,526,077 more than in the first half of 1909. Unfilled orders on the books June 30 were 4,257,794 tons, being 1,144,720 tons less than on March 31 and 1,669,237 tons less than on Dec. 31, 1909; but 199,755 tons more than on June 30 of last year.

Baltimore

July 25—Exports for the week included 1642 tons steel rails and 368,492 lb. rail joints to Tampico, Mex.; 2301 tons structural and other steel to Panama. Imports included 1685 tons ferromanganese and 3000 tons iron ore from Great Britain; 30,400 tons iron ore from Cuba.

Birmingham

July 25—The plans of curtailment now in effect in Alabama may have a good effect on the Southern pig-iron market. Just as soon as the demand takes up the accumulated stocks a better condition all around can be expected. So far, the month has been disappointing. The iron manufacturers in this section have not lost hope, but are looking forward to the next fortnight for a change in the general conditions. The accumulated stocks of iron will care for the business that is looked for during the next month, no matter how big an improvement there is in the demand. Prominent iron men say that as soon as the production and demand is regulated there will be a change for the better. The iron quotations in the Southern territory are around $11.50 per ton, No. 2 foundry, though reports are still heard of $11.25 and $11 per ton for spot and $12 for delivery during the latter part of the year.

There is no improvement noted in the steel situation in the Southern territory. Basic and charcoal irons are in a better demand than the foundry iron.

Chicago

July 26—The iron market is very quiet. Buying of pig iron is at its lowest stage for several weeks. "Summer quiet" explains something of it, but a greater cause probably is the feeling, commonly expressed by melters of pig iron, that too much of their raw material is being produced and prices must rule lower unless production is curtailed. Every melter feels that it is good policy to buy in small quantities, for the needs of not more than 90 days ahead. Some contracts are being made for 1911 deliveries and inquiries for such iron are numerous, showing that the trade is keeping close watch on the trend of the market. But actual sales for anything farther ahead than three months are few.

Quotations continue unchanged—$16.50@17 for Northern and $11.50@12, Birmingham ($15.85@16.35, Chicago), for Southern No. 2 being the rule for early deliveries. The furnace agents are still unwilling to quote these prices for 1911 delivery, asking 25 or 50c. more. Some Southern, indeed, is said to be obtainable at $11.25, but $11.50 is probably had on nearly all the early-delivery sales. Northern iron is relatively stronger than Southern.

Cleveland

July 25—The iron-ore movement continues large, the boats in commission being fully occupied. No sales reported.

Pig Iron—Inquiries received and transactions closed have been small. The differences among sellers continues, some being willing to make concessions, while others hold to their prices. Bessemer pig is quoted $16.25@16.50; No. 2 foundry, $14.25@14.75; forge, $14@14.25; Lake Superior charcoal, $18.50@19, all Cleveland delivery.

Finished Material—A little more interest is evident, and some fair sales of plates have been made. Several small contracts for structural steel are reported; also for plates, the latter on a basis of 1.37½@1.40c., Pittsburg. There is more inquiry for bar iron. Steel bars are firmer at 1.45c. Pittsburg base. Steel bars are selling at about 1.85c. out of store, and the store trade in Cleveland territory is improving.

Philadelphia

July 27—The only interest manifested in the market this week is in basic iron, and large sales are on the point of being made. Prices have weakened in Western markets and the weakness is reflected here. The volume of pending transactions is only guessed at and there may be a slip at the last moment which will reduce sales to unimportant figures. Brokers and makers report quite a number of small sales of foundry and forge. Consumers are not inclined to risk the placing of large orders. Users of malleable iron have been taking a little more for later delivery at concessions recently extended. Good-sized contracts for iron for pipe-making purposes have been placed, with deliveries in two or three cases to extend well up to the end of the year. No. 2 X foundry is quoted at $16@16.50; gray forge at $15.25@15.50 and basic at $15.50 per ton.

Steel Billets—Large transactions are said to be pending and the underlying fact appears to be that if the prices offered are accepted the sales will be made. Prices are weak at the recent drop.

Bars—An improved tone is reported and a few fair-sized orders for early delivery have been placed. Prices are weak.

Sheets—Manufacturers report an active July demand in small lots for immediate delivery. It is understood that stocks are low in stores.

Structural Material—Orders for bridge material have just been placed, most of it being wanted as early as September. Current quotations have reached the lowest point probable.

Scrap—The scrap market is practically dead this week. Dealers are on the war path for special lines of scrap, chiefly heavy melting steel and heavy cast.

Pittsburg

July 26—The general feeling in the trade is that too much pig iron is being made, but this applies only to merchant grades. The steel interests have, if anything, reduced their stocks of pig iron and they are accumulating no semi-finished or finished steel, the entire pig-iron production of steel interests being represented in current shipments of steel.

There is good reason to believe that these are, at the moment, materially below the actual rate of ultimate consumption. There are still large stocks of merchant steel pipe in the hands of some jobbers, who are drawing upon them. Jobbers' stocks in other lines are probably down to normal, but shipments are still at a reduced rate to some manufacturing consumers, like automobile and agricultural implement makers, whose inventories require a long time. It is common talk in the steel trade, however, that the automobile business has been badly overdone and the hopes for large consumption in the future are being centered around the motor truck, the growing use of which is regarded as a strictly business proposition. As to merchant pig iron, the outlook is that production will have to be restricted further in order to work off stocks, but as to steel, the outlook is that production will have to be increased.

Prices for steel products show no advance, but very little declining tendency. The shading in sheets has perhaps become a trifle more general, but tinplates are firmly held and steel bars, at 1.45c., Pittsburg, are, if anything, firmer than 30 days ago, for the shading of $1 a ton in the Chicago district seems to have disappeared. Bars, indeed, are higher than plates and shapes, as these have lately declined to 1.40c., Pittsburg.

Pig Iron—Alice furnace, at Sharpsville, will blow out by the end of this week, and this will leave 10 of the 21 merchant furnaces in the Valleys in operation: Cherry Valley and McKeefrey, at Leetonia, and one Andrews & Hitchcock, at Hubbard, on foundry iron, Stewart, at Sharon, on low phosphorus, and Brier Hill and Youngstown Steel, at Youngstown, Struthers, at Struthers, and three Shenango, at Sharpsville, on bessemer and basic. A lot of about 10,000 tons of basic pig has been sold at $14, Valley, the whole lot to be paid for cash. Occasional sales of No. 2 foundry in small lots are made at $14.50, Valley, and this is the quotable market, although any large business would presumably develop a somewhat lower price. Bessemer has become purely nominal, with no recent sales to test the market. We quote at Valley furnaces, 90c. higher delivered Pittsburg: Bessemer, $15.50; basic, $14.25@14.50; No. 2 foundry, $14.50; forge, $13.75; malleable, $15 per ton.

Ferromanganese—The market continues dull and quotable at $39@39.50 for prompt and $39.50@40 for forward, f.o.b. Baltimore, freight to Pittsburg being $1.95 per ton.

Steel—The market has become slightly softer and previous quotations are largely nominal, awaiting important inquiry to test the market. We quote prices nominally at $25 for bessemer billets and $26 for open-hearth, with sheet bars $1@1.50 higher than billets and rods at $29@30, all f.o.b. Pittsburg.

Sheets—A curious position is presented in the sheet market. Nearly a month ago the shading of the regular official prices of the American Sheet and Tin Plate Company by some independents reached $3 a ton on black and $4 on galvanized sheets, with similar shading on painted and galvanized corrugated roofing. Since then this cutting has extended to the majority of independents, but the American company insists that it is not deviating from its regular prices, although it admits this puts its customers in an undesirable position. Many in the trade at large have professed the belief that the market is secretly being met. Eventually a cut deeper than the present shading by independents, may be made by the leading interest. Meanwhile we quote the prices of the leading interest at 2.40c. for black, 3.50c. for galvanized, $1.70 for painted corrugated roofing and $3 for galvanized corrugated roofing, with cutting by many independents of $3 on black and $4 on galvanized material. Blue annealed sheets remain quotable at the regular price of 1.75c. for 10 gage.

FOREIGN IRON TRADE

German Iron Production—The German Iron and Steel Union reports the make of pig iron in May at 1,261,735 metric tons, being 59,618 tons more than in April. The daily average was 40,070 tons in April and 40,701 in May, an increase of 631 tons, or 1.6 per cent. For the five months ended May 31 the total output was, in metric tons:

	1909.	1910.	Changes.
Foundry iron	944,200	1,144,951	I. 200,751
Forge iron.....	293,382	280,476	D. 12,906
Steel pig.....	447,585	537,096	I. 89,511
Bessemer pig.....	172,425	206,110	I. 33,685
Thomas(basic)pig	3,327,476	3,814,328	I. 486,852
o tal.....	5,185,068	5,982,961	I. 797,893

METAL·MARKETS

New York, July 27—The metal markets do not show any notable change; though there has been more activity in copper. Prices show no material changes.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

Metal.	Exports.	Imports.	Excess.
Gold:			
June 1910..	$1,598,347	$ 4,575,917	Imp.$ 2,977,570
" 1909..	8,346,446	2,367,735	Exp. 5,978,711
Year 1910..	49,516,731	19,388,531	" 30,128,200
" 1909..	63,834,337	20,135,592	" 43,698,745
Silver:			
June 1910..	4,587,383	3,308,171	Exp. 1,279,212
" 1909..	5,505,037	4,339,275	" 1,165,762
Year 1910..	27,054,218	21,901,520	" 5,152,698
" 1909..	29,359,666	22,872,028	" 6,487,638

Exports from the port of New York, week ended July 23: Gold, $740; silver, $1,257,093, chiefly to London. Imports: Gold, $1,826,247, chiefly from London; silver, $37,259, from the West Indies and Central America.

Gold—The premium paid for gold on the open market in London last week has disappeared, and prices are again 77s. 9d. per oz. for bars, and 76s. 5d. per oz. for American coin. About $2,000,000 was taken for shipment to New York; most of the rest of the supply was taken for Berlin.

Platinum—Business is on a small scale, but prices are unchanged. Dealers quote $33 per oz. for refined platinum and $37.50@38 per oz. for hard metal.

Our Russian correspondent writes, under date of July 7, that a further considerable increase in prices for the last week is to be noted. The production of this year does not seem to correspond to the increasing demand from abroad. From Ekaterinburg it is reported that dealers and producers abstain from sales, expecting yet higher prices. The metal is quoted at Ekaterinburg, 7.40 rubles per zolotnik—$27.82 per oz,; in St. Petersburg 29,000@29,500 rubles per pood for crude platinum, 83 per cent. metal—$28.67 per oz., average.

Silver—The squeeze on spot silver has relaxed and as a consequence, quotations in London has fallen nearer to the equivalent of the Bombay price.

SILVER AND STERLING EXCHANGE

July.	21	22	23	25	26	27
New York....	54 5/16	54 1/16	54 3/16	54 1/16	53 3/4	53 5/16
London.....	25 1/4	25 3/16	25 1/16	25	24 7/8	24 13/16
Sterling Ex..	4.8555	4.8555	4.8560	4.8565	4.8560	4.8545

New York quotations, cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

Exports of silver from London to the East from Jan. 1 to July 14, reported by Messrs. Pixley & Abell:

	1909.	1910.	Changes.
India.....	£3,317,800	£3,569,500	I. £ 251,700
China.....	1,155,100	1,113,500	D. 41,600
Straits.....	82,800	.....	D. 82,800
Total.....	£4,555,700	£4,683,000	I. £ 127,300

India Council bills in London sold at an average of 6d. per rupee.

Foreign commerce of the United States, six months ended June 30, as valued by the Bureau of Statistics, Department of Commerce and Labor:

Merchandise:	1909.	1910.
Exports.....	$ 787,973,170	$ 804,740,728
Imports.....	717,997,382	800,331,422
Excess, exports	$ 69,975,788	$ 4,409,306
Add excess of exports, silver.....		5 152,698
Add excess of exports, gold.....		30,128,200
Total export balance.....		$ 39,690,204

The movement of gold and silver in detail will be found in the table at the head of this column.

Gold and silver movement in Great Britain, six months ended June 30:

	Imports.	Exports.	Excess.
Gold £32,832,281	£22,116,138	Imp.£10,716,143	
Gold, 1909...	29,075,511	19,572,158	Imp. 9,503,353
Silver.....	7,004,026	6,226,403	Imp. 777,623
Silver, 1909	6 389 246	6,613,189	Exp. 223,943

Copper, Tin, Lead and Zinc

July.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. New York, Cts. per lb.	Lead. St. Louis, Cts. per lb.	Zinc. St. Louis, Cts. per lb.
21	12¾ @12⅞	12⅝ @12¾	55 1/16	32⅞	4.40 @4.45	4.30 @4.32½	4.97½ @5.02½
22	12¾ @12⅞	12⅝ @12⅞	54 13/16	32¾	4.40 @4.45	4.30 @4.32½	4.97½ @5.02½
23	12⅞ @12⅞	12⅝ @12⅞	....	32¾	4.40 @4.45	4.30 @4.32½	4.97½ @5.02½
25	12½ @12⅝	12⅝ @12⅞	54 3/16	32⅝	4.40 @4.45	4.32½ @4.35	5.00 @5.05
26	12½ @12⅝	12½ @12⅞	54 1/16	32⅝	4.40 @4.45	4.32½ @4.35	5.00 @5.05
27	12⅛ @12⅝	12⅝ @12⅞	54 1/16	32⅝	4.40 @4.45	4.32½ @4.35	5.00 @5.05

London quotations are per long ton (2240 lb.) standard copper. The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis New York, cash. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The intimations as to probable curtailment of production that became public last week induced some buying, and rather large transactions were consummated on July 21 and 22, after which there was a lull, followed by renewed interest on July 27. The transactions were both for domestic and foreign account, chiefly the latter. The market was somewhat irregular, some transactions being carried through at 12½c., delivered, corresponding to about 12.30@12.35c., cash, New York, and a trifle lower, while other business was done at 12⅜c., delivered. The market improved in tone upon the announcement by the Utah Copper Company that it would curtail its production. The market for Lake copper during the week of July 21-27 was dull. At the close Lake copper is quoted at 12½@12⅝c.; electrolytic copper in cakes, wirebars and ingots at 12⅛@12⅜c., and casting copper is nominally quoted at 12@12¼ cents.

Copper sheets are 18@19c. base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 14c. base, carload lots at mill.

On July 21 the London market took a sudden turn, due to the rumors of curtailment, and reached its high point at £55 1s. 3d. for spot and £55 13s. 9d. for three months. Since then, owing to bear selling and to the weak stock exchanges, it has declined, but closes firm at £54 10s. for spot and £55 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £56 10s.; best selected, £58@58 10s.; strong sheets, £66@67 per ton.

Henry R. Merton & Co., under date of July 16, state that a fair quantity of the copper put on the market has been absorbed by the trade, and deliveries from public warehouses promise to be good.

Exports of copper from New York for the week were 5811 long tons. Our special correspondent gives the exports from Baltimore for the week at 1037 tons.

Tin—The London market still remains very dull and transactions small. The close is cabled at £149 5s. for spot and £150 7s. 6d. for three months.

The spot and July position is becoming very acute in this market. Dealers who have still to cover July requirements find it difficult to do so, and were forced to pay a premium up to 1c. per lb. against August delivery. On July 26, 33½c. was bid and 34c. asked for July delivery. For August the market closes at about 32⅝c. per pound.

Lead—Spot and near-by shipments seem to be scarce. The reason for this must be sought in the very hot weather which prevents regular work at the refineries and shipments naturally decrease. The close is firm at 4.32½@4.35c., St. Louis, and 4.40@4.45c., New York.

The London bears have been successfully depressing the market and it closes easy at £12 8s. 9d. for Spanish, and £12 11s. 3d. for English lead.

Spelter—While the demand has not been enlarged, the offers, on the other hand, were also small and producers are asking higher prices, which are being paid especially for near-by delivery. The market closes at 5@5.05c., St. Louis, and 5.15@5.20c., New York.

New York quotations for spelter, July 21-23, inclusive, were 5.12½@5.17½c.; July 25-27, inclusive, 5.15@5.20 cents.

The demand on the part of foreign consumers has again become quite active and a good business is reported from the London market, which closes firm at £22 12s. 6d. for good ordinaries, and £22 17s. 6d. for specials.

Base price of zinc sheets is $7.50 per 100 lb., f.o.b. La Salle-Peru, Ill., less 8 per cent. discount.

Other Metals

Aluminum—The market continues quiet both here and abroad, and demand is less pressing than it has been. Prices are again a shade off, 22¾@23c. per lb. being quoted for No. 1 ingots in large lots, New York.

Antimony—Business is still light, and in the absence of large sales there is nominally no change in prices. Cookson's is quoted at 8.15@8.20c. per lb. Other prices are 7⅞@8c. for U. S.; 7¼ @7½c. for outside brands.

Quicksilver—Business remains rather quiet, but prices are unchanged. New York quotations are $47 per flask for 75 lb. for large orders; $48@49 for jobbing lots. San Francisco, $46@46.50 for domestic orders and $2 less for export. The London price is £8 15s. per flask, with £8 12s. 6d. quoted by jobbers.

Nickel—Large lots, contract business, 40@45c. per lb. Retail spot, from 50c. for 500-lb. lots, up to 55c. for 200-lb. lots. The price for electrolytic is 5c. higher.

Magnesium—The price of pure metal is $1.50 per lb. for 100-lb. lots, f.o.b. New York.

Cadmium—Current quotations are 60 @70c. per lb. in 100-lb. lots, f.o.b. New York; according to quality of metal.

Bismuth—The price of bismuth has recently been advanced and the metal is now quoted by Johnson & Matthey, who handle it in England, at 7s. 6d.—$1.80—per lb. in London.

Zinc and Lead Ore Markets

Joplin, Mo., July 23—The highest price paid for zinc sulphide ore was $44.70, on a base of $41 per ton of 60 per cent. zinc. From this the base ranged down to $38. Zinc silicate ore sold on a base of $20@23 per ton of 40 per cent. zinc. The average price, all grades of zinc ore, was $36.54. Lead maintains the same steady prices, there being no change for several weeks, with ores of 80 per cent. and better selling at $49 per ton and shading down at the rate of $1 per ton for each

SHIPMENTS, WEEK ENDED JULY 23.

	Zinc, lb	Lead lb.	Value.
Webb City-Carterville	3,823,810	699,560	$89,791
Joplin	2,193,430	313,360	51,467
Granby	1,127.330	15,920	16,555
Duenweg	531,470	60,330	10,748
Alba-Neck	455,170	.....	9,786
Galena	342,460	49,320	7,701
Spurgeon	405,930	74,500	7,689
Miami	390,420	62,360	5,431
Badger	263,310	.....	5,297
Carthage	186,960	.....	3,832
Sarcoxie	130,750	.....	2,614
Cave Springs	121,720	3,080	2,385
Carl Junction	80,960	.....	1,700
Quapaw	70,370	14,700	1,688
Stott City	63,720	.....	1,210
Greenfield	35,780	.....	357
Totals	10,223,590	1,293.130	$218,351
30 weeks	327,820,460	48,833,900	$7,745,899

Zinc value, the week, $186,818; 30 weeks, $6,488,398
Lead value, the week, 31,533; 30 weeks, 1,257,501

MONTHLY AVERAGE PRICES.

Month.	Zinc Ore. Base Price. 1909.	Zinc Ore. Base Price. 1910.	Zinc Ore. All Ores. 1909.	Zinc Ore. All Ores. 1910.	Lead Ore. All Ores. 1909.	Lead Ore. All Ores. 1910.
January	$41.25	$47.31	$38.46	$45.16	$52.17	$56.99
February	36.94	40.69	34.37	39.47	50.50	53.64
March	37.40	43.60	34.71	39.71	50.82	51.26
April	38.63	41.00	37.01	39.33	55.63	49.72
May	40.06	40.19	37.42	37.51	56.59	48.16
June	44.15	40.20	40.35	37.83	57.52	48.80
July	43.06	.....	41.11	.....	53.74	.....
August	48.25	.....	44.54	.....	57.60	.....
September	47.70	.....	44.87	.....	56.11	.....
October	49.50	.....	45.75	.....	55.02	.....
November	51.31	.....	48.29	.....	53.94	.....
December	49.45	.....	47.57	.....	55.26	.....
Year	$43.98	.....	$41.20	.....	$54.60	.....

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

unit shown under 80 per cent., with further deductions for moisture. Average, all grades, $48.78 per ton.

The shipment this week was an increase of 250 tons of zinc and a decrease of 279 tons of lead compared with last week. The shipment of the year to date is 3929 tons of zinc and 687 tons of lead, less than a like period of last year. The production is growing again, a few of the sheet-ground mines with highest grade ore having resumed, while the free-ore area is increasing in output a little each week. The strike at the mines of the American Zinc, Lead and Smelting Company has been arbitrated and these mines are resuming.

Platteville, Wis., July 23—The base price paid this week for 60 per cent. zinc ore was $40 per ton; no premium price was reported. The base price paid for 80 per cent. lead ore was $48@50 per ton.

SHIPMENTS, WEEK ENDED JULY 23.

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Platteville	697,600	.....	462,300
Galena	655,120	.....	.....
Highland	323,000	.....	.....
Cuba City	267,440	122,200	152,020
Harker	186,170	.....	.....
Hazel Green	78,000	.....	.....
Benton	.....	60,000	.....
Total	2,207,330	182,200	614,320
Year to date	46,539,576	4,158,719	12,270,565

Shipped to separating plants 2,698,980 lb. zinc concentrates during the week.

Other Ore Markets

Iron Ore—Current quotations for Lake Superior ores, on dock at Lake Erie ports, are: Bessemer ore—base 55 per cent. iron and under 0.45 phsophorus—$5 per ton for Old Range and $4.75 for Mesabi; nonbessemer—base 51.5 per cent. iron—$4.20 for Old Range and $4 for Mesabi.

In the East there is no organization of sellers, and a wide range of prices exists, according to quality and location of mines. A good nonbessemer ore, around 50 or 55 per cent. iron, can be had at $3@3.50 per ton, f.o.b. mines; but no general quotations can be given.

Manganese Ore—The base price, as fixed by the large buyers, is 25c. per unit for manganese and 5c. per unit for iron content, for a base ore containing 49 per cent. or over in manganese, not over 0.20 phosphorus and 8 per cent. silica. Prices range down to 23c. per unit for 40 per cent. manganese; with dedctions for excess of phosphorus and silica.

Pyrites—Domestic furnace sizes fetch 11@11½c. per unit, delivered at eastern acid works; fines, 10¾@11c. Pyrites containing arsenic realize from ½@1½c. per unit less.

Tungsten Ore—Ferberite, wolframite and huebnerite ores, $6.50@7 per unit per ton of 2000 lb for ore containing 60 per cent. of tungsten trioxide. For scheelite ores, 50c.@$1.50 per unit less.

Zinc Ore—For Rocky mountain blende, delivered at Kansas smelting points, the current price is for the zinc content, less eight units, at the St. Louis price for spelter, less $14@15 per 2000 lb. of ore, according to quality, especially as to iron and lead content. See also Joplin and Wisconsin ore markets.

CHEMICALS

New York, July 27—The general markets continue quiet and no change is expected for a month.

Copper Sulphate—Sales are on a moderate scale, at unchanged prices; $4 per 100 lb. for carload lots and $4.25 per 100 lb. for smaller parcels.

Arsenic—This article is reported weaker. A considerable unsold stock is pressing on the market, and quotations are weak at $2.25 per 100 lb. for white arsenic.

Nitrate of Soda—Business is fair and prices are very firm at 2.10c. per lb. for both spot and future positions.

Phosphates — Imports of American phosphates into Germany are reported by the consul-general at Hamburg, as follows for 1909: Florida rock, 265,813; Florida pebble, 107,834; total, 373,647 tons, an increase of 7992 tons over the preceding year.

Petroleum

July 26—June productions and deliveries are reported by the *Oil and Gas Journal,* as below, in barrels of 42 gal. each:

Field.	Production.	Deliveries.
Pennsylvania	2,891,352	5,985,105
Illinois	2,399,605	1,156,895
Mid-continent (Oklahoma)	4,720,401	4,673,123
Gulf Coast	927,000	927,000
California	7,000,000	5,650,000
Total	17,938,358	18,392,123

Total stocks held on July 1 are estimated at 132,823,595 bbl., an increase of 1,310,783 bbl. during June.

MINING·STOCKS $

New York, July 27—Early in the week there was a bad break in many stocks in the general market, the moving cause being the declaration of a dividend of ¾ per cent. by the National Lead Company, in place of the usual 1¼ per cent. This caused heavy selling of the metal and smelting stocks, and a sympathetic decline in others. Since then there has been little recovery, and the market at the close is badly depressed.

The Curb has also been weak and irregular. Copper stocks did not hold their prices, generally showing declines. There was some activity in Cobalt stocks.

The Amalgamated Copper Company has declared its usual quarterly dividend of ½ per cent.

Auction sales of securities in New York, July 14, included $10,000 Steel Corporation 5 per cent. bonds at 102¾; 25 shares United States Steel preferred, $115.75 per share; $5000 Gypsum Manufacturing Company bonds, March coupons on, $100 for the lot; 100,000 shares Red Mountain Railroad, Mining and Smelting Company, $1 par, $100 for the lot.

Boston, July 26—Copper shares show a firm tone although the market does not have the stability that could be wished for. Reports that an agreement had been reached to restrict copper production gave the market a start late last week, notably the Cole-Ryan issues, but the high

COPPER PRODUCTION REPORTS.
Copper contents of blister copper, in pounds.

Company.	April.	May.	June.
Arizona, Ltd.	2,340,000	2,610,000	2,802,000
Balaklala	1,109,311	1,148,762	1,226,000
Boleo (Mexico)	2,777,800	2,735,680	2,115,314
Copper Queen	9,920,000	10,283,855	10,219,687
Calumet & Ariz.	2,400,000	1,778,000	2,490,000
Cananea (Mexico)	4,262,000	4,300,000	4,280,000
Detroit	1,930,000	2,035,639	2,017,000
Imperial	800,000	700,000	800,000
Nevada Con. (Est.)	5,500 000	5,500,000	5,400,000
Old Dominion	2,325,000	2,174,000	2,092,000
Shannon	1,288,000	1,326,000	.....
Superior & Pitts.	2,130.000	2,276,000	2,245,000
Utah Copper Co.	7,902,643	3,862,900	.....
Butte District	25,000,000	24,850.000	23,750,000
Lake Superior	16,250,000	19,250,000	18,000,000
Total production	86 934,754	89,830,836	.....
Imports, bars, etc.	21,180,396	24,850,919	.....
Imp. in ore & matte	12,527,371	6,487,243	.....
Total	120,642,521	121,168,998	.....

Butte district and Lake Superior figures are estimated; others are reports received from companies. Imports duplicate production of Cananea, and that part of Copper Queen production which comes from Nacozari. Boleo copper does not come to American refiners. Utah Copper report includes the output of the Boston mill.

STATISTICS OF COPPER.

Month.	United States Product'n.	Deliveries, Domestic.	Deliveries for Export.
VII, 1909	118,277,603	75,520,083	75.018,974
VIII	120,597,234	59,614,207	48 382,704
IX	118,023,139	52,105,955	50 077,777
X	124,657,709	66,359,617	56,261,238
XI	121,618,369	66,857,873	55,266,595
XII	117,828,655	69,519,501	59,546,570
Year	1,405,403,056	705,051,591	680,942,620
I, 1910	116,547,287	78,158,387	81,691,672
II	112,712,493	66,618,322	37,369,518
III	120,067,467	62,944,818	40,585,767
IV	117,477,639	67,985,951	31 332,434
V	123,242,476	59.305,222	45,495,400
VI	127,219,188	53,363,196	65,895,948

	Visible Stocks.		
	United States.	Europe.	Total.
VII, 1909	154,858,061	150,928,960	305,787,021
VIII	122,596,607	171,492,160	294,088,767
IX	135,196,930	197,993,600	333,190,530
X	151,472,772	210,224,000	361,696,772
XI	153,509,626	222,566,400	376,076,026
XII	153,003,527	236,857,600	389,861,127
I, 1910	141,766,111	244,204,800	385,970,911
II	98,463,339	248,236,800	346,700,139
III	107,187,992	254,150,400	361,338 392
IV	123,824,874	249,625,600	373,450,474
V	141,984,159	246,870,400	388 854,559
VI	160,425,973	239,142,400	399,568,373
VII	168,386,017	232,892,800	401,278,817

Figures are in pounds of fine copper. U. S. production includes all copper refined in this country, both from domestic and imported material. Visible stocks are those reported on the first day of each month, as brought over from the preceding month.

levels were not maintained with the continued weakness of the New York market. There is little or no commission house buying in copper stocks and the floor traders are making the market for these issues.

Even with the savage break and generally demoralized condition of the Wall Street market today copper shares held remarkably well. Naturally they were weak, but none broke to the low records of a few weeks ago, although one or two sold pretty close to these former lows.

Lake and North Butte are the local market features outside of Amalgamated. Both show resistance market-wise.

Curb transactions have been of the same quantity, comparatively with about the same trend of prices as in the big market. Today witnessed a reaction in the general list there.

Assessments

Company.	Delinq.	Sale.	Amt.
Alpha Con., Nev.	July 30	Aug. 24	$0.05
Belcher, Nev.	July 4	July 29	0.10
Best & Belcher, Nev.	July 31	Aug. 24	0.10
Black Jack, Utah.	Aug. 16	.....	0.01
Bullion, Nev.	Aug. 11	Sept. 12	0.05
Chollar, Nev.	July 3	July 29	0.10
Con. Imperial, Nev.	July 31	Aug. 25	0.01
Con. Virginia, Nev.	Aug. 1	Aug. 26	0.25
Copper King, Ida.	July 30	.....	0.01
Gould & Curry, Nev.	July 17	Aug. 10	0.10
Hale & Norcross, Nev.	Aug. 2	Aug. 26	0.10
Hancock Con., Mich.	Au Oct.	.....	3.00
Julia, Nev.	Aug. 6	Sept. 6	0.03
King Philip Copper, Mich.	Aug. 9	.....	1.00
Lower Mammoth, Utah.	Aug. 15	.....	0.05
Mexican, Nev	July 23	Aug. 17	0.20
New York, Utah.	Aug. 15	.....	0.02
Ophir, Nev.	July 4	Aug. 2	0.25
Raven, Mich.	Aug. 15	.....	0.10
Scorpion, Nev.	Aug. 11	Sept. 6	0.02
Silver Hill, Nev.	July 27	Aug. 22	0.05
Winona, Mich.	Aug. 9	.....	1.00

Monthly Average Prices of Metals

SILVER

Month.	New York.		London.	
	1909.	1910.	1909.	1910.
January	51.750	52.375	23.843	24.154
February	51.472	51.534	23.706	23.794
March	50.468	51.454	23.227	23.690
April	51.428	53.221	23.708	24.483
May	52.905	53.870	24.343	24.797
June	52.538	53.462	24.166	24.651
July	51.043	.....	23.519	.....
August	51.125	.....	23.588	.....
September	51.440	.....	23.743	.....
October	50 923	.....	23.502	.....
November	50.703	.....	23.351	.....
December	52.226	.....	24.030	.....
Total	51.502	.....	23.706	.....

New York, cents per fine ounce; London, pence per standard ounce.

COPPER.

	New York.				London.	
	Electrolytic		Lake.			
	1909.	1910.	1909.	1910.	1909.	1910.
January	13.893	13.620	14.280	13.870	61.198	60.923
February	12.949	13.332	13.295	13.719	57.688	59.388
March	12.387	13.255	12.826	13.586	56.231	59.214
April	12.56½	12.733	12.93⅞	13.091	57.363	57.238
May	12.893	12.550	13.238	12.885	59.338	56.313
June	13.214	12.404	13.548	12.798	59.627	55.310
July	12.880	.....	13.363	.....	58.556	.....
August	13.007	.....	13.296	.....	59.393	.....
September	12.870	.....	13.210	.....	59.021	.....
October	12.700	.....	13.030	.....	57.551	.....
November	13.125	.....	13.354	.....	58.917	.....
December	13.298	.....	13.647	.....	59.906	.....
Year	12.982	.....	13.335	.....	58.732	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

TIN AT NEW YORK

Month.	1909.	1910.	Month.	1909.	1910.
January	28.060	32.700	July	29.125	.....
February	28.290	32.920	August	29.966	.....
March	28.727	32.403	September	30.293	.....
April	29.445	32.976	October	30.475	.....
May	29.225	33.125	November	30.859	.....
June	29.322	32.769	December	32.913	.....
			Av. Year	29.725	.....

Prices are in cents per pound.

LEAD

Month.	New York.		St. Louis.		London.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	4.175	4.700	4.025	4.582	13.113	13.650
February	4.018	4.613	3.868	4.445	13.313	13.328
March	3.986	4.459	3.835	4.307	13.438	13.063
April	4.168	4.376	4.051	4.225	13.297	12.641
May	4.287	4.315	4.214	4.164	13.225	12.550
June	4.350	4.343	4.291	4.207	13.031	12.688
July	4.321	.....	4.188	.....	12.563	.....
August	4.363	.....	4.227	.....	12.475	.....
September	4.342	.....	4.215	.....	12.781	.....
October	4.341	.....	4.215	.....	13.175	.....
November	4.370	.....	4.252	.....	13.047	.....
December	4.569	.....	4.459	.....	13.125	.....
Year	4.273	.....	4.153	.....	13.049	.....

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Month.	New York.		St. Louis.		London.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	5.141	6.101	4.991	5.951	21.425	23.350
February	4.889	5.569	4.739	5.419	21.562	23.188
March	4.757	5.637	4.607	5.487	21.438	23.031
April	4.965	5.439	4.815	5.289	21.531	22.469
May	5.124	5.191	4.974	5.041	21.975	22.100
June	5.402	5.128	5.252	4.978	22.000	22.219
July	5.402	.....	5.252	.....	21.969	.....
August	5.729	.....	5.579	.....	22.125	.....
September	5.796	.....	5.646	.....	22.906	.....
October	6.199	.....	6.043	.....	23.200	.....
November	6.381	.....	6.231	.....	23.188	.....
December	6.249	.....	6.099	.....	23.094	.....
Year	5.503	.....	5.352	.....	22.201	.....

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

PRICES OF PIG IRON AT PITTSBURG.

	Bessemer.		Basic.		No. 2 Foundry.	
	1909.	1910.	1909.	1910.	1909.	1910.
January	$17.18	$19.90	$16.40	$17.98	$16.26	$17.94
February	16.73	18.96	16.09	17.21	15.90	17.38
March	16.40	18.53	15.84	16.93	15.62	17.00
April	15.79	18.28	15.05	16.84	15.06	16.75
May	15.77	17.10	15.02	15.94	15.08	16.18
June	16.13	16.52	15.84	15.60	15.63	15.53
July	16.40	.....	15.90	.....	15.96	.....
August	17.16	.....	16.17	.....	16.20	.....
September	18.44	.....	16.80	.....	17.03	.....
October	19.75	.....	17.84	.....	18.02	.....
November	19.90	.....	18.37	.....	18.09	.....
December	19.90	.....	18.15	.....	17.90	.....
Year	$17.46	.....	$16.46	.....	$16.40	.....

STOCK QUOTATIONS

COLO. SPRINGS July 26

Name of Comp.	Bid.
Listed:	
Acacia	.05⅞
Cripple Cr'k Con.	.02
C. K. & N.	.18
Doctor Jack Pot	.09
Elkton Con.	.77
El Paso	.85
Fannie Rawlins	.05½
Findlay	.10
Gold Dollar	.14
Gold Sovereign	.03
Isabella	.18
Mary McKinney	.53
Pharmacist	.03
Portland	1.16
Vindicator	.91
Work	.03½
Unlisted:	
Golden Cycle	1.50
United Gold Mines	.07

SALT LAKE July 26

Name of Comp.	Clg.
Carisa	.23
Colorado Mining	.31
Columbus Con.	.55
Daly Judge	4.25
Grand Central	1.35
Iron Blossom	.74
Little Bell	1.10
Little Chief	‡.22
Lower Mammoth	.14½
Mason Valley	6.50
Maj. Mines	.53
May Day	.03
Nevada Hills	2.10
New York	.13
Prince Con	.69
Red Warrior	‡6.00
Silver King Coal'n	1.90
Sioux Con.	.16
Uncle Sam	.21
Victoria	‡1.07½

SAN FRANCISCO. July 26.

Name of Comp.	Clg.	Name of Comp.	Clg.
COMSTOCK STOCKS		MISC. NEVADA	
Alta	.09	Belmont	3.80
Belcher	‡.75	Daisy	.04
Best & Belcher	.35	Jim Butler	.24
Caledonia	.45	MacNamara	.30
Challenge Con.	.19	Midway	.23
Chollar	.19	North Star	.04
Confidence	‡.65	West End Con.	.57
Con. Cal. & Va.	.71	Atlanta	.10
Crown Point	.35	Booth	.13
Exchequer	‡.18	C.O.D. Con.	.06
Gould & Curry	.23	Columbia Mt.	.04
Hale & Norcross	.23	Comb. Frac.	.49
Mexican	1.22	Great Bend	.02
Ophir	1.17	Jumbo Extension	.41
Overman	.75	Oro	.08
Potosi	.30	Red Hill	.02
Savage	.12	Sandstorm	.04
Sierra Nevada	.26	Silver Pick	.07
Union Con.	.35	St. Ives	.10
Yellow Jacket	.60	Tramps Con.	.04

N. Y. EXCH. July 26

Name of Comp.	Clg.
Amalgamated	56⅛
Am. Agri. Chem.	35
Am.Sm.&Ref.,com	62¼
Am. Sm. & Ref., pf.	97⅜
Anaconda	34½
Bethlehem Steel	20
Col. & Hock. C. & I.	4¼
Colo. Fuel & Iron	24
Du Pont P'd'r, pf.	84¾
Federal M. & S.	55
Great Nor., orectf.	48½
Nat'nalLead,com.	46⅜
National Lead, pf.	100½
Nev. Consol.	17⅞
Pittsburg Coal	12
RepublicI&S,com.	27¼
Republic I & S, pf.	83
SlossSheffi'd,com.	50
Sloss Sheffield, pf.	103
Tennessee Copper	19¾
Utah Copper	40½
U. S. Steel, com.	62⅛
U. S. Steel, pf.	111⅞
Va. Car. Chem.	55

N. Y. CURB July 26

Name of Comp.	Clg.
Bonanza Creek	‡3
Boston Copper	‡18
Braden Copper	3½
B. C. Copper	4⅜
Buffalo Mines	‡2½
Butte Coalition	16
Caledonia	‡1
Chino	10⅞
Cobalt Central	9⅛
Cobalt Prov.	‡59
Con. Ariz. Sm.	1
Cumberland Ely	‡9
Davis-Daly	1½
Dominion Cop.	‡7
Ely Con.	‡.20
El Rayo	3½
Florence	2⅝
Gila Copper	‡5
Giroux	6
Gold Hill	½
Goldfield Con.	8
Greene Cananea	6⅝
Guanajuato	‡1⅝
Guggen. Exp.	‡185
Kerr Lake	7⅛
La Rose	3¼
McKinley-Dar-Sa.	.93
Miami Copper	17⅜
Mines Co. of Am.	57
Mont. Shoshone	‡.37½
Mont.-Tonopah	‡.98
Nev. Utah M. & S.	
New Baltic	5
Newhouse M. & S.	‡3½
Nipissing Mines	10⅛
Ohio Copper	1⅞
Pacific Sm. & M.	⅛
Ray Central	2½
Ray Con	16¾
Silver Queen	‡.35
Standard Oil	585
Stewart	⅝
Tonopah	8⅛
Tonopah Ex.	‡.70
Tri-Bullion	⅛
W. Va. Wyo. Cop.	‡2
Yukon Gold	3⅞

LONDON July 27

Name of Com.	Clg.
Dolores	£1 10s 0d
Stratton'sInd.	0 3 3
Camp Bird	1 7 0
Esperanza	2 12 6
Tomboy	0 16 6
El Oro	1 5 6
Oroville	0 6 6
Mexico Mines	8 12 6

BOSTON EXCH. July 26

Name of Comp.	Clg.
Adventure	4¾
Allouez	33
Am. Zinc	20½
Arcadian	‡3½
Arizona Com.	13¼
Atlantic	5
Boston Con.	‡15
Butte & Balak	11
Calumet & Ariz.	47½
Calumet & Hecla	515
Centennial	15
Con. Mercur	6
Copper Range	59
Daly-West	6
East Butte	6½
Franklin	10
Granby	30
Hancock	14⅞
Helvetia	2
Indiana	10¼
Isle Royale	15
Keweenaw	3¼
Lake	32
La Salle	9
Mass	6¼
Michigan	3⅞
Mohawk	43
Nevada	17⅞
North Butte	21½
North Lake	7
Ojibway	5⅞
Old Dominion	32
Osceola	114¼
Parrot	12
Quincy	69½
Shannon	9⅜
Superior	37
Superior & Bost	8
Superior & Pitts.	10½
Tamarack	51
Trinity	4¾
U. S. Smg. & Ref.	34½
U.S.Sm. & Re., pd.	45⅜
Utah Apex	2½
Utah Con.	20
Victoria	2¼
Winona	5½
Wolverine	105
Wyandotte	1¼

BOSTON CURB July 26

Name of Comp.	Clg.
Ahmeek	145
Bingham Mines	‡3
Boston Ely	1¼
Boswyocolo	.07
Cactus	2
Calaveras	9⅞
Champion	.05½
Chemung	‡8½
Chief Cons	1⅜
Cons. Ariz.	1½
Corbin	4¾
Crown Reserve	2½
First Nat. Cop.	3⅛
Inspiration	6⅞
Mackinaw	.04
Majestic	.53
Nat'l Mine	.17
Nevada-Douglas	2¼
Oneco	2
Raven Copper	.17
Rhode Island Coal	6½
San Antonio	7
Shattuck-Ariz.	22
South Lake	4⅝
Superior & Globe	.20
Trethewey	1⅞
Tuolumne Copper	2¼
Vulture	9⅛
Yuma	.20

‡Last quotation.